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MODERN EDUCATIONAL IDEALS.*

BY FRANK NOYCE, I.C.S.

NEVER in English History has so great an interest been taken in educational questions as is the case to-day. The war has revealed many of the weak joints in our armour and in education as in other spheres. There is much that the nation is bent on remedying and that right speedily. For this reason, as Lord Bryce says in the introduction to this deeply interesting volume of essays, there is special need at the present time for the re-statement and enforcement by argument of sound educational principles. Dr. Benson has collected the views of eleven prominent educationalists, almost all of whom are either head-masters or ex-head-masters of English public schools. It must be admitted that it is a defect in the book that it deals too exclusively with secondary education and that it is confined almost entirely to the education of boys. It would have been more complete and, possibly, even more interesting if the views of some head-mistresses had been included as well as those of Cambridge graduates with experience of primary school education. There are many such. Mathew Arnold was an Inspector of elementary schools. None the less, the fundamental principles of education remain the same, be the schools primary or secondary, in England or in India.

A volume of essays by different hands, more especially when they deal with such a thorny subject as education, is not an easy book to review briefly. In the one before us, there is, however, a striking consistency of treatment throughout. The author's pleas for the education of the future fall under three main heads.

The first of these is that education should be interesting. As one of the essayists says, there is a theory still widely held amongst teachers that the value of a subject or of a method of instruction depends upon the amount of drudgery which it involves or the degree of repulsion which it excites. History and geography have consisted of nothing more than the memorising of dull and unrelated facts. The ordinary school boy does not realize that history can be as good reading as a novel until—probably out of school hours—he lights upon the pages of Macaulay. The classics, Dr. Benson asserts, are made unattractive by the method of giving such short snippets and by insisting on what used to be called thorough parsing. Even *Alice in Wonderland*, he adds, could only prove a thoroughly bewildering book, if read at the rate of twenty lines a lesson and if the principal tenses of all the verbs had to be repeated correctly. This applies not only to the teaching of the classics but also to that of modern languages. It is essential in the case of both, a

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* *Cambridge Essays on Education.* Edited by A. C. Benson, C.V.O., LL.D., Master of Magdalene College. With an introduction by the Right Hon. Viscount Bryce, G.C.M. Cambridge University Press.

any genuine love of literature is to be aroused, that something should be read fast enough to give some sense of continuity and range and horizon. Guessing at the meaning of words instead of being punished should be encouraged. It is, in reality, far better mental discipline than turning over the pages of dictionary. The use of translations, provided they are good ones, and the wretched "cribs" of one's own school-boy days is not to be deprecated. Grammar should be dropped as a subject of special study. All that is necessary can be picked up by the way.

The second plea is that education should be general and not specialized. A good all round education is far more valuable than the vocational—or thoroughly practical—education that many parents were demanding a short time ago. Specialization ought not to begin until a comparatively late stage in a boy's career. The evils of premature specialization are increased rather than diminished if that premature specialization is vocational. Sir John McClure, Head-master of Mill Hill School, illustrates this point by a quotation from a recent article by Professor Leacock on the movement in Canada some twenty years ago for a "thoroughly practical education in schools and universities." The railroad magnate, the corporation manager, the multiform director and all the rest of the group known as captains of industry, began to besiege the universities clamouring for practical training for their sons. Mr. Leacock inspected "one great and famous Canadian school" at which practical banking was taught so resolutely that they had wire gratings and little wickets, books labelled with the utmost correctness and all manner of real looking things. It all came to an end, and now it appears that in Canada they are beginning to find that the great thing is to give a school-boy a mind that will do anything; when the time comes, "you will train your bankers in a bank." It may be that everybody has not recognized this, and that the railroad magnates and the rest of them are not yet fully convinced; but Mr. Leacock declares that the most successful schools of commerce will not now attempt to teach the mechanism of business, because the solid orthodox studies of the university programme, taken in suitable selective groups offer the most practical training in regard to intellectual equipment that the world has yet devised." Two of the writers, Dr. Inge and Dr. Bateson, pleaded for a greater recognition of the place of science in education. Dr. Inge does so with no little eloquence. It seems to him that, as an instrument of mind training, and even of liberal education, science has a far higher value than is usually conceded to it by humanists. Dr. Bateson is not very hopeful about the future of science in education and there is a somewhat acid flavour about his essay which is absent from the rest of the book. In his opinion, the utmost limit of success which conditions admit is some inoculation of scientific interest and ideas upon the susceptible members of the talking classes, the politician, the lawyer, and the journalist, who assume the leadership of the country because they have a special gift, which under the conditions of democratic government, has a prodigious opportunity.

If education is to be complete, one subject which it must include in addition to science and the humanities, is citizenship. So holds Mr. Mansbridge, the founder of the Workers' Educational Association, which has done such sterling work in the development of citizenship in and through education persued in common by university and working men and whose activities have, it is to be hoped, been only temporarily interrupted by the war. The study of civic relations in schools has been developed to a much greater extent in America than in England probably because the American need, owing to the constant influx of people of different nationalities to the United States, has been

more obvious. None the less something has been done in England, both directly and indirectly. Such movements as boys' brigades, boy scouts, girl guides and Church lads' brigades are all, in their several ways, doing much to develop citizenship.

The third plea is that education should be more individualistic than it has been in the past; both in and out of school. It should not be the clever boy alone who receives attention but the bent of each boy's mind should be studied and developed. In school, for example, the creative instinct which is seldom absent even in the dullest boy, should be fostered. Boys should be encouraged to write poems, stories or essays of their own. Out of school, ample time should be given them for the cultivation of their hobbies. Mr. Malim, the Head-master of Haileybury, has some wise observations on the proper place of games. Whilst he admits their importance in developing the qualities of physical courage, self-control, endurance, public spirit, fair play and leadership, he points out that an unwilling player never makes a good player. Cricket, he somewhat sorrowfully admits, means a serious waste of time in many cases. The summer half holidays are emphatically the time for hobbies and it is a serious charge against games if they are developed to such a pitch that hobbies are practically prohibited. Mr. Badley, the Head-master of Bedales School, urges that expeditions in pursuit of outdoor interests, such as natural history or archæology, should be an alternative to games or compulsory for those who have not an equivalent hobby. He has many practical suggestions to make regarding the right use of leisure indoors both in the pursuit of intellectual interests and in various kinds of handicrafts.

If education is to be on the lines sketched in this volume, of whose contents it has been possible to give only a very imperfect sketch, it is obvious that the ranks of the teaching profession must be recruited from the very best men. There can be no doubt that this has not been the case in the past. Far too many men have taken up teaching on leaving the universities not from a sense of vocation but because nothing else seemed open to them as they had not the means to wait until a practice at the Bar or in medicine came to them. The prospects of a career and the chances of obtaining distinction in the teaching profession have been too few to attract men of ability and ambition in adequate number. Mr. Roscoe, the Secretary of the Teachers Registration Council, the genesis of which he describes in the last essay in the book, sees in that Council the dawn of better things. He considers that it furnishes the framework of a possible teaching profession and gives promise of securing for teachers a definite status by establishing a standard of attainment and qualification.

We cannot better conclude than by quoting Mr. Paton's summing up of the aim of educational reform. "England is looking to her schools as she never did before. The aim of her education must be both high and wide, higher than lucre, wider than the nation and the aim of our education cannot be fulfilled until the education of other peoples is infused with the same spirit. Education like finance must be planned on international lines by international consensus with a view to world peace. Only so can it fulfil the ultimate end which already looms on the horizon.

Becoming when the time has birth
A lever to uplift the earth
And roll it on another course."

THE HOUSING OF THE POOREST.

By Patrick Abercrombie, M.A.

ONE of the most difficult aspects of the post-war Reconstruction Problem will be the "Housing of the Poorest," a phrase which usually includes dealing with the insanitary property that exists in nearly every town and is scattered throughout the country. It is only in this lowest scale of the Housing question that demolition bulks so largely; for though many people would like to see acres of our dreary and respectable suburbs swept away, this is perhaps too visionary an ideal, and the most we can do is to organize the provision of more attractive houses and surroundings in the hope that by degrees the "bye-law" suburb will have become so unpopular that no one will live in it and the proprietors will be forced to rebuild or have their houses empty.

But the Slum, where the poorest are housed, is another thing; we cannot wait for a similar natural process to get rid of it; for it has become a pressing question of Public Health and its continuance is as dangerous to the community as the sale of tainted milk or diseased meat. It is, of course, but natural that the only section of the community which is unable to pay an economic rent should find itself living in buildings whose vigorous life is ended, but whose worthless old age has been prolonged into a senile and miserable dotage. Thus in the past, private enterprise, which has built 95 per cent of the houses of the country, has left the "Poorest" severely alone, and what little has been done is due to private philanthropy and public authorities acting as custodians of public health.

But a policy which begins with destruction is necessarily less attractive, more complicated and more costly than one which is Constructive from the start; attention is inevitably focussed on the providing of new houses, and these situated on the outskirts, where land is not complicated by having already been developed. Again, some of the tendencies that appear most promising and hopeful for future urban growth, tell against the slum problem. It is recognised that the soundest means of getting rid of slum areas is not by converting them into new residential quarters, but through the commercial and industrial growth of a town rendering their clearance an economic necessity; this is manifestly what is about to happen in the Don valley, where are the heavy steel works of Sheffield and where slum dwellings occupy some of the finest factory sites in the world. But against this is the present tendency (admirable in all other respects) towards decentralisation of industry, greatly about to be stimulated by a National Supply of Electric power, available on trunk lines through open country. This will naturally make slumland in existing towns less required; and the lofty building of shopping stores and the vertical growth of business premises tend to prevent the central business area from spreading into its inevitable ring of decayed residential property which has grown into our slums.

But in spite of its complexity and the greater attractiveness of other aspects of housing Reform, a country bent upon the Reconstruction of its national health cannot afford to neglect the Poorest and their hovels, whether in town or country. If ordinary and comparatively healthy Town conditions produce an inferior physique to the modern Garden Village, how much less likely are the frankly unhealthy surroundings of the slums to produce a race capable of making up the wastage of the war? In a paper read some years ago before the Royal Sanitary Institute, Dr. G. W. Eustace clearly demonstrated the effect of Hygiene upon the wage earning capacity of the People; and it is perhaps worth while

recalling the comparison of weights of boys between the ages of six and fifteen in two schools, one at Port Sunlight and the other at a Liverpool Council School; starting with a fairly similar weight of 44 lbs. (Port Sunlight) and 38 lbs. (Liverpool) at the age of six, we find the difference slightly increased at 13 from 80 to 68, more marked at 14 with 105 lbs. against 75 lbs. and most notable at 15, the difference being 107 lbs. and 64 lbs; from this latter figure it will be seen that the Liverpool boy actually begins to *lose weight* at the very moment that he approaches a wage earning age. A similar contrast between the two Schools was obtained in heights. It must be remembered that the Liverpool School was not attended by slum children, but by those of the labouring class, whose parents have constant employment. It is difficult to say exactly how many people at present inhabit slums, as this term is too vague for accurate definition; but it is somewhere near the mark to say that between 5 and 10 per cent of our working-class population at present live in houses unfit for human habitation. This state of affairs with its natural consequence of high infant mortality and poor physique is one the nation simply cannot afford to allow to continue.

It may be well to enquire how it is that after all these years of Housing Reform effort, and in spite of the help of various Housing Acts, we are still faced with this unsolved problem. Have the Local Authorities not done their duty, or has the Local Government Board exercised insufficient vigilance? The answer may perhaps be given in a sentence; a national obligation has been handed over to be paid for by local funds; and the work has proved too costly for all but a few extremely courageous authorities. Again, it has not been sufficiently recognised that to demolish insanitary property is not sufficient; as the poorest are unable to pay an economic rent and are thus unacceptable as tenants to private enterprise, they have crowded into the surrounding houses, producing new slums to take the place of those demolished.

The experience of Liverpool is of great value, as this city has attempted more completely than any other to solve the three-fold problem of destruction of unsanitary property; prevention of consequent overcrowding in surrounding property; and the rehousing of those dispossessed. In 1864 there were in the town 22,000, insanitary houses of the vilest description, containing a population of over 100,000 people. From that year the Corporation began demolishing these buildings and by 1894, 40,000 persons had been uprooted. The land so obtained if not left vacant, was either sold off for building purposes or the Corporation itself built houses; but in all re-building an economic proposition was carried out, with the consequence that none of these uprooted persons had been rehoused, and new slums were being created to the destruction of better neighbourhoods: thirty years of energetic work had merely aggravated the disease and there was a strong feeling in some quarters that the work had better cease. Instead, the Housing Committee embarked upon an entirely new policy, namely, that the new schemes should be devised so as to house those persons who had been turned out of the insanitary property, and the rents kept within their reach, whether the scheme paid or no. The result has been an entire success—in one instance 99 per cent of the dispossessed are living in the new houses; the mortality rate of those concerned has fallen from 50 to 27 per thousand; the decrease in crime is no less striking, the figures according to the report of the Chief Constable in 1910 "indicating real personal regeneration."

But the cost has been enormous; the rehousing of 8,000 people produces a loss of £22,000 per year or £2-15s. a head, apart from the cost of demolition and clearance; and this may be taken as an average (based

on pre-war figures) of what it will cost the nation to rehouse on *similar* lines, the whole section of the population that is living in unsanitary houses.

But before dealing with the possibility of a different financial aspect of the work, it is necessary to point out that there is an alternative to the Liverpool method of rehousing on practically the same spot. It has been frequently suggested that these people might be taken to the outskirts and cheap land developed for them there. The difficulty of their casual dock work, as in Liverpool, has been met at Antwerp by means of a telephone labour bureau and cheap fares; the labourer, if no work be forthcoming, is thus able to spend a profitable day in the garden. But while it should be possible to offer a dispossessed tenant the chance of living on equally easy financial terms on the outskirts, it is not likely that many avail themselves of it in the great cities; they have, as has been truly said, their own schools, their own churches, their own associations, which a great many are very desirous of retaining; human beings cannot be treated like cattle, driven to pastures new, whenever their beneficient guardians consider their health requires it. At the same time, customs change in a single generation—and the gardening habit, stimulated as it has been by the war, may draw out of the centre the children of those who prefer to live in the clean and airy tenements provided by the Corporation in the heart of the city.

Other suggestions have been put forward—but they are of little worth—thus some people have advocated the system of general post, in which new houses on the outskirts are built for the better-off labouring classes, the worst houses destroyed, and a move up anticipated all round: but though plausible, this is a thoroughly bad policy; the poorest, if they are to leave their slums, should move into *new* buildings especially designed and as sanitarily finished as a hospital—to suggest that they should occupy houses a shade less frousy than those they have left, is to hold out no helping hand for their regeneration. It is also impossible to trust to a natural redistribution, which would merely lead to a further creation of slums. Nor can the proposal put forward by the Urban Land Report be recommended; namely that the Corporation might purchase the cheapest *habitable* houses (vacated through the general post) and if necessary renovate them. People who have been unaccustomed to live in decent houses and who have lost the habit of cleanliness require something more definitely new, the last word in scientific construction and convenient labour saving arrangement. What Dostoieffski calls "the poor people's smell" should be impossible in the new houses.

What, then, is the policy which the Nation must adopt in order to eliminate this wastage of energy and life? Firstly, the whole question of the Housing of the Poorest must be considered as a Health Proposition and be dealt with by the Ministry of Health, as one of its most urgent functions.

A Survey at once shonld be instituted, in order to discover, without any blinking of fact, how many unsanitary houses there are in the whole country, and the nature of their unsanitariness—whether due (1) to decay, (2) faulty design at the outset, (3) environment. It is quite true that the Regulations of the Housing and Town Planning Act of 1909 provided the framework for such a Survey, to be carried out by the Medical Officers. But we know that in the past Authorities have been loath to condemn where they realised that it was impossible adequately to build for those dispossessed; or where special hardship was entailed upon owners who had kept their property in repair, which however was so obsolete in design as to be a menace to health. The Survey required must not be governed by such expedients, but must show, in a scientific and dispassionate way, the extent, location and nature of all slum property in

this Kingdom, just as Booth's Survey of London dealt with the conditions and occupations of the people. This Survey, also, should not be an isolated investigation, but *part of an exhaustive study of our national* resources and defects, graphically set forth, as a basis for general Reconstruction.

With this survey before the Ministry of Health, the extent of the evil will be manifest and an adequate scheme can be formed by means of which it should be possible within a definite period to sweep away all undesirable houses and substitute others in their stead. Dealt with in this way it will be seen that it is not a question of local responsibility and rates, but of national control. And one of the first things which the nation will have to settle will be the amount which it is prepared to pay for the slums and the land they stand upon. This initial cost has kept back much of the housing activities of local authorities in the past, and it is not difficult to understand their reluctance to deal with the poorest, when one compares the price of £ 350 per acre for which Manchester has obtained land for housing on its outskirts, with the sum of £1,606,688 which London has expended upon the purchase of fifty-one acres of slums; and when one sees that Liverpool has found the cost of a site raised from 40/- a yard to 60/- by the fact that some public houses had to be included in the scheme. A writer on Housing Reform recently said "It is not enough to say that if the community destroys property, the community must be prepared to pay. We destroy bad meat, but instead of paying for it, we punish those who own it," and it is to be seen if the nation agrees with this.

Having made its Survey, obtained possession of the slums, and shouldered the financial responsibility, it remains for the Ministry of Health to decide upon the best method of carrying out the rehousing schems. However much one would like to see the inhabitants transported en bloc to the fresh air and gardens of the outskirts, this is too sudden a change to aim at directly, though much can be done by means of improved means of communication, quick and cheap tramways, etc. Indeed, it cannot be too frequently emphasised how closely bound up with general town-planning and city reconstruction is the rehousing of the slum dwellers. Much, of course, depends upon the individual circumstances; in Sheffield, for instance, almost ideal surroundings are found on the tablelands flanking the valley *in which the workers are situated; it was* only access that was required to this suitable neighbouring land. In smaller towns, also, the difficulties of getting out into new land are not great, and in villages, where it is usually not a case of insanitary areas but of single decayed houses, the new ones can be placed *near* though not actually *on* the sites of the old ones.

But there must always remain a very large population in the big cities that will require rehousing somewhere near their old haunts, and it is here that a new solution may be looked for. Possibly something in the nature of temporary dwellings might be devised, which would last for the period of population flux, succeeding the war. In spite of the playgrounds and amenities of the Liverpool Flats, and their admirable planning one would not like to look upon this as a permanent or universal solution of the problem.

A final word must be said on this suggested National Control. There must be no danger of an excessive centralisation: overcrowding and house provision is an essentially local question and with national aid the local authorities can carry out whatever scheme is devised. But the Ministry of Health must have its local inspectors even as the Board of Education has; and it might be suggested that the country for this, as for other purposes, might be divided up into regions (on a more logical plan than existing counties) each with its Housing Bureau and Resident

Commissioner, who besides being a Government watchdog should be prepared to advise and assist Local Authorities in the preparation of their schemes.* By this means a general national policy could be carried out, with the necessary modifications to suit local requirements, based upon minute knowledge of local conditions.

The question as to why these people are unable to pay an economic rent, is somewhat outside the scope of the Housing of the Poorest, which, as its name implies, presupposes the existence of such disability. The final solution will never be arrived at until every worker receives a wage which will enable him to pay an economic rent. But in the meantime the vicious circle of the bad houses producing the poor physique and low wage earning capacity, and the consequent inability to earn sufficient for an economic rent, must be broken. No Wages Board will be of any service for this class, until the slums are eliminated.

It was quite right to limit the immediate post-war housing, to the provision of entirely new dwellings; but it will be fatal if the housing enthusiasm of the nation, which has never before reached so high a pitch, should cool down after building half a million new houses. When these are completed the local authorities might well turn over the providing of new houses to Private Enterprise (the reduction in building cost and increase in ways having in the interim made this economic proposition) and the next job of work for the local authorities, acting for the Ministry of Health should be the clearance of every slum area and slum cottage in town and country.

* This policy of decentralization of the L. G. B. in order to increase its constructional activities, has been recommended by Committees of the Reconstruction Ministry and the L. G. B.

IRON INDUSTRY IN INDIA.

By F. B. Shroff, M.A., M.S.C.I.,

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THE history of iron dates back to very old times. The archæologist and the ethnologist finds it in the old civilisations of Egypt, Rome, Greece and India. But the modern industry which first evolved in England and in which now America reigns supreme is a creature only of the past two centuries. We have been often told that in India once thrived that Iron Industry whose monuments we yet see in the iron girder at Puri or in the gun of Narwar or in the sword of Golconda. But that industry pales before the modern industry in its gigantic scale, in its use of mechanisms and appliances and scienitfic and economic principles, and in the variety of its products.

The industry ran through vicissitudes and changes in every country. As the needs of iron and steel grew, the processes were improved to cheapen production and to conform to standards of requirements, and these changes in prices and processes reacted on the iron producing centres. Not only the centres passed from provinces to provinces, but the freaks of fortune ebbed and flowed and whirled the status of the different nations.

Charcoal was the only fuel first used in England and America and on the Continent, and the only credit given to those who sold the new discovered fuel, anthracite, was that they were accused of selling stones as fuel. Owing to scarcity of charcoal the iron industry in England in 1740 had dwindled so much that it could not supply the home demand. It was the introduction of anthracite that rekindled the industry, and it is now the use of coke that maintains it. During the charcoal period the trade flourished in the forests which migrated in

the coke period to coal beds and to ports. With introduction of Bessemer process a number of puddling furnaces of South Wales had to be closed and the open hearth process allowes the Bessemer centres to eke out their bare existence, on the profits of the phosphatic slag. The ore producing districts of England are almost exhausted and except its cleavland ore, foreign ores are now mainly feeding its furnaces.

And so in America. The introduction of the basic process of steel production opened out a bright future for the phosphatic Lake deposits and the old mines of New York and Pennsylvania thus languished. And the supremacy of England passed out to America, because besides its rich deposits in coal and iron there was a vast market in the developing country and because there was scarcity of labour that drove the manufacturer to superb mechanisms and to wonderful methods of transportation.

And what placed Germany second only to America? The invention of this same basic process was a boon to Germany. In its useless ores of Luxemberg and Lothringen it found enormous wealth. In spite of coal and transportation difficulties, it had been able to establish its position by the levying of heavy import duties, by the formation of syndicates and by the development of its educational and economic policies.

These factors that have been of immense importance in moulding the iron industries of the three biggest iron producing nations of the world must needs engage our attention in shaping a policy for India. They are the nature and extent of raw materials—ore, fuel, flux, furnace materials, etc.—their distances and facilities for working and transportation, the market—both the demand and the distance—together with the facilities of transporting the finished products, location of factories, the adoption of particular processes of manufacture, the use of up-to-date machinery and means of transportation, formation of syndicates and a protected tariff system.

So late as 1897 Mr. Jervoise Baines speaking at the International Congress of Technical Education propounded the theory of want of coal and iron ore in India. It was on the same unfounded notion that a great opportunity of Indian Iron Industry was lost at the time of the first opening of the Railways which created a vast market. The fact is that rich iron ores were long known to exist in many parts of India from Salem and Malabar in the South to Punjab in the North. The rich deposits of Chanda, Jubbulpore and Rewah in Central Provinces are simply awaiting to be worked and so also the deposits of Gwalior in Central India. In the East in Bengal, in Chota Nagapur and in Orissa the ores are now already worked by the Pioneers of the Industry.

The fuel problem is rather not so very encouraging for India. Coal deposits are chiefly located in Bengal and Behar and these are being utilised by the present factories. The Central Provinces show signs of existence of coal beds, a few small mines were actually worked and recently we hear of an important find of a big deposit there, which augurs well for an iron industry in these provinces. In Assam the coal measures unfortunately have no concomitant rich or extensive ore deposits.

Sweden yet supplies charcoal iron of high quality to Sheffield. The charcoal iron of old India was also of very pure quality. But in these days cheaper steel generally replaces that product and it is well nigh impossible for that industry to stand competition.

Electricity is coming into greater prominence in the preparation of high class steel. But whether it will be able to displace the blast furnace it is difficult to say. For that purpose extremely cheap electricity is required, at about one pie a unit. In no place in the world it has been yet possible even to supply at nearly double that rate. India presents very hopeful features for the generation of a cheap hydro-electric power and there is every probability of a big scheme

being undertaken in that direction by the Government of India in near future. But perhaps even that would not satisfy the needs of manufacturing cheap cast iron.

Transportation facilities to carry the ore or coal to the meeting place have been in India, as elsewhere, the important considerations in deciding the location of iron industries. The late Mr. Jamshedji Tata, the Carnegie of India, discerned in the proximity of this fuel to the ores of Chota Nagpur and Orissa a great future for the Indian Industry and launched his adventure. The Bengal Iron and Steel Works are also favourably situated; and the new company which Messers. Burn and Co., have floated at Calcutta will enjoy the additional advantage of being near the port. These three factories have fortunately not been much confronted with the problems of distances of their two chief raw materials. The embryonic Mysore industry courts not coal and hopes to have a free hand in the South. For the future industries the cases of Central Provinces, Central India and Assam engage special attention on the distances of these raw materials. Pittsburg furnaces are fed from mines one thousand miles apart. But the ore chiefly traverses the Lake and for the small distance for which the ore is carried on rail, the freight is very small. England is supplied by Spanish ore out here again it is carried by ships, besides English factories enjoy the river and sea facilities in export.

Turning to process of manufacture the present process of blast furnace cast iron and the basic open hearth steel will probably have a long stay. These must be also the mainstay or spine of the Indian Industry. But for conserving vigour it must have exercise on the path of progress; it has already the motive factors in the utilisation of the blast furnace slag as cement and in the most recent discovery of the source of potassium salts in the blast furnace gases. But whether any new motive factors will ever develop into wings to fly this industry away from India we cannot say. May God forbid it!

India must make up for any of the difficulties of coal by employment of the most modern mechanisms and of the skilled and expert hands. All these we must import; but these same will give us home products in the next generation. Will not the Jamshedpur Works be the source of these mechanisms in the near future and will not the contemplated Metallurgical College down there be the source of the expert hands?

Indian manufacturers of iron have not heretofore suffered from internal competition. But do they expect to be immune to that? Will India have the syndicates or corporations of America? Will she have a protected tariff system of Germany? She does not aspire so much for the one, she will not get the other as much as desired. The total world production of pig iron is now nearing a hundred million tons a year of which India is not even producing five lacs. India is consuming about twenty lac tons of iron and steel and their manufactured products of all sorts. The incidence of cost of iron and steel materials to the people of India is about a rupee per head annually. The programmed industrial development and shipbuilding in India will open a vast market but in order that new iron centres can be created and old may continue to flourish a combination of interests is most desirable. India must export iron and steel. Japan, Australia, Africa, Mespotamia are yet open markets. Japan has not yet discovered in it rich and extensive ore deposits. But Russia and China are potentialities of first magnitude. Will not Japan have a hand in working these in the future? It looks, once again, the opportune time for developing this industry has come to India. Let not that opportunity slip.

What will be the future of this Indian Industry? Will new centres arise? Will the C. P. find out the coal in near future? Will Gwalior solve its transportation difficulties? Will Assam find out a rich and extensive ore deposit or be otherwise helped? Yes, these may happen. The hydro-electric schemes and the electrification of Railways will cheapen transportation and coal. The growing demand will solve the difficulties of market. Let the present industrialists combine and promote these prospects to realities, let coal be saved and electricity substituted in other industries wherever possible, let markets be allocated so that the present factories supply the home demand. To satisfy the Indian aspirations for industrial development this industrial thermometer must record high.

CHEMICAL METHODS FOR UTILIZING WOOD WASTE.

By W. B. Campbell, B.Sc.

THE fact that tremendous quantities of wood are wasted in Canada is well-known to everyone. The waste begins in the forest and continues all through the various operations which the wood must undergo before it reaches the consumer in its finished form. Every time the wood is handled a greater or lesser amount of it is lost in some form of waste. Much of this waste is necessary at the present time, but on the other hand a great deal of the waste material can be put to use even now. Moreover, as the timber supply becomes depleted and the incentive to save becomes proportionally greater, a great deal more of this waste will be utilized and will become an economic asset where now it is only a source of loss.

The first form of wood waste to be encountered in studying the question is that of the tops, branches and roots, which are discarded in the bush. As a rule in this country these are left to rot away where they fall, or else they are piled up and burnt to prevent further fire-risk, and to clear the ground for future growth. The logs themselves are usually floated to the mills and there the bark is stripped off and burnt, making another source of waste. These logs are then sawed up and another portion (ten to twenty per cent) goes to waste in sawdust, and still more wood goes into slabs and edgings, which are frequently burnt to dispose of them. Boards are cut to standard lengths and the odd ends are usually wasted. The defective pieces are frequently also burned. The shavings and odd pieces produced in planing mills generally go to waste and those made in actual construction work are practically always wasted. Most of these wastes are small in themselves and possibly many of them are too small even to be eliminated : but they are wastes nevertheless, and, as such, are responsible for some proportion of the high cost of living. It is only when they are taken in the aggregate that they assume proportions sufficiently great to make an impression on the ordinary layman. When, however, he is told that this waste amounts to $10.00 or $15.00 annually for every man, woman and child in the country, it begins to assume proportions such as may seem worthy of his notice.

How much of this waste it is possible to eliminate is, of course, unknown. A great deal of it is inevitable for the reason that the labour-cost of putting many of these products into forms commercially valuable is greater than the value of the products so produced. But some of these can be utilized profitably, and one of the objects of the opening up of the Forest Products Laboratories is to discover and spread the knowledge of methods for such utilization.

Much has been done by the lumbermen themselves through their various associations to make an asset of many forms of waste wood. This work has been mostly along the lines of using up the small pieces produced by the mills which can be nsed to advantage by other mills, which do not necessarily require that their saw material be in large-sized sticks. Box factories, spool manufacturers, toy makers and factories making such articles as hammer-handles, etc., are frequently able to use the odd pieces produced in the manufacture of larger articles.

But the vast quantities of shavings, sawdust and edgings mostly go to waste yet, and to these is directed the attention of chemists all over the world, since chemical utilization seems to be the most promising field in this connection.

The object of the following brief statements is to present a synopsis of some of the results already obtained, without going

into the details of any of them. While all of these various industries have proved successful—that is, profitable—it should be recognized from the start that in each case much preliminary investigation is absolutely necessary, for what is successful in one locality may prove to be complete failure in another. Most of these industries require a large and constant supply of raw material, expert technical supervision, and frequently a considerable outlay of capital for expensive equipment. The market also has to be considered, particularly in its relation to the particular locality in which the raw material is found. When these conditions are found to be favourable after proper consideration, then it is well worth while going further into the matter.

Manufacture of Pulp and Paper.

The manufacture of pulp and paper from wood is an industry which has proved itself stable and of increasing magnitude for a number of years. Almost every kind of wood has been proved suitable for the manufacture of some form of paper, but there are considerations affecting the use of each kind which must always be observed. Most of the pulp is made from the wood cut specially for the purpose, but almost any wood can be used, provided that it is reasonably free from dirt, knots and bark, or that these can be easily removed from it. Sawdust is an exception of this rule on account of the fact that the fibres are cut so short that the pulp produced will not, felt properly and the cooking is made considerably more difficult. There are several mills in the United States at present using mill-slabs, shavings and other forms of waste more or less entirely. The advantages of waste wood are, of course, its cheapness and its quantity. There are several disadvantages. It is usually green and full of water, has a large percentage of bark and comes in irregular shapes. Shavings are rather better for the purpose, and, if in sufficient quantity, make very good raw material. Another point to be taken care of in using waste material such as this, is to use the raw material of only one species, or, at least, species sufficiently alike that they may respond to the same treatment. For instance, on account of the relatively large content of resin in longleaf pine, it will not do to treat this in the same way as spruce. Neither will it be satisfactory to work hard and soft woods together in any one treatment, though any of these can be worked satisfactorily if kept separate. The process to be used will depend chiefly on the raw material at hand and on the market for any particular variety of pulp.

Hardwood Distillation.

The distillation of hardwood, with the resultant production of charcoal, acetate of lime and wood alcohol, is an industry which is well developed and pretty stable. The latter two products are regularly quoted market articles. Charcoal is usually disposed of locally for domestic purposes, unless there is a charcoal-iron furnace within shipping distance.

Besides the wood cut especially for the purpose, hardwood slabs and other odd pieces of hardwood can be used. Where the wood is not cut especially for distillation, the plant is usually run in connection with a saw mill, so that only the part not suitable for lumber is used for the distillation. Almost any hardwood in pieces three or four inches in length and upward is suitable, but sawdust and shavings are not suitable—firstly, on account of the fact that the small size of the material makes it such a poor conductor of heat that it is impossible to char it completely in the ordinary forms of apparatus used, and, secondly, because the charcoal produced is so finely divided as to make it difficult to cool and handle, and because there is no market for it.

The woods most frequently used are beech, birch and maple, with smaller amounts of other woods as they may occur with the first-mentioned.

RESINOUS WOOD DISTILLATION.

The development of the industry of distillation of resinous, or "soft" woods for the production of charcoal, wood creosote and turpentine, is much later than that of distilling the hardwoods, and the practice is not yet standardized to any great extent, though a great deal has been done along this line in the last few years. The value of a resinous wood for distillation is in proportion to the amount of resin, or "pitch," contained in the wood. This resin content is quite variable, even in trees of the same species and iu different parts of the same tree, so that some care is necessary in the selection of the wood for distillation to avoid using wood which is too lean to yield a profit.

Pine is the wood most used and is taken mostly in the form of "lightwood." Stumpwood is also used to a considerable extent, but is usually left to the last, since it is much harder to collect and handle. Almost any kind of resinous wood is suitable to some extent, the only question being whether it contains sufficient resin to make the recovery worth while, and so is largely a matter to be considered in connection with the particular location in question. Where sawmill waste is used, the matter of selection is not so important, as the cheapness of this material makes up, to some extent, for the poorer material. This class of material, however, is not rich enough to render the more complex and expensive processes feasible, and the simpler and more rapid steam-distillation processes must be used. This recoveres only the volatile oils which were originally present in the wood, and so the process is very wasteful, but is the only one at all successful with this class of material. Destructive distillation plants for resinous wood are the cheapest form to construct. They produce products of rather poor quality, however, and so the market is somewhat restricted. There are also some processes known as "bath processes" in operation. In these the wood is run into a retort and flooded with some high-boiling solvent of the turpentine and light oils. These are heated and extract the oils from the wood, and are then drained off and the oils recovered from the solvent by distillation with steam. Various solvents are used, but rosin appears to be the best at present.

Processes using a low-boiling solvent, such as naphtha, have found increasing use in the last few years, but the decreasing price of turpentine and the increasing cost of solvent has made the business increasingly difficult.

TANBARK AND TANNING EXTRACT.

Tannin is obtained from the leaves, bark and wood of a great many trees, but only a few of these (practically only hemlock and a couple of species of oak) are used commercially. Usually these are sold in the form of bark and the tanners make the extract themselves. In some cases, however, it may be of advantage to make the extract nearer the bush and save the freight on the bulky bark. The method of extraction is very simple and the extract can easily be concentrated and shipment made easy.

MANUFACTURE OF ETHYL ALCOHOL.

This is a process for the manufacture of ethyl (or "grain") alcohol from wood as distinct from the methyl (or "wood") alcohol produced by the destructive distillation. Ethyl alcohol is not poisonous in the same way as wood alcohol, and a very broad market is open for it, if production is made sufficiently cheap. Since the wood used in this process must necessarily be finely divided, almost any kind of waste wood is suitable as the large-sized pieces can be easily reduced to the proper size.

The process used consists of the conversion of the cellulose of the wood into a sugar; the sugar is then fermented to produce the alcohol and this is distilled off. The process is on a paying basis in Europe, and in at least one plant in America.

CATTLE FOOD.

Cellulose, or wood fibre, may be converted

—at least partially—into a sugar, with comparative ease. There are alse several other carbohydrates formed in the process. A considerable proportion of the products so made are digestible by cattle, and, especially when mixed with other products, such as peanut meal, rice meal, alfalfa, it seems to make good cattle food and finds a market.

MANUFACTURE OF OXALIC ACID.

Finely ground wood fused with caustic soda forms sodium oxalate from which oxalic acid may easily be produced. The manufacture of this product may prove profitable, though the restricted market would be against it. A very little wood used in this way would produce all the oxalic acid used in the country. Almost any species of wood is suitable.

WASTE WOOD FOR PRODUCER GAS.

Several forms of apparatus for the production of producer gas from waste wood have been put on the market lately and are finding considerable favour. The production of power from waste wood in this way is much more economical than burning the wood under steam boilers, especially when small-sized stuff, such as sawdust and shavings, are to be disposed of. The commercial success depends on the demand for the power produced. Any kind of wood can be used, though it is an advantage to have it of fairly uniform size and preferably dry. The woods with the higher calorific values are, of course, somewhat more efficient.

Further information regarding any of these methods will be gladly supplied by the Forest Products Laboratories, McGill University, Montreal.

The work of these laboratories is directed entirely along the lines of utilization of wood waste and improved methods in the manufacture of forest products.

All information and results of the laboratories are *free* to the public and will be gladly supplied npon request.

SOME TESTS OF INDUSTRIAL PROGRESS.

BY THE EDITOR.

AMONG the best tests of industrial progress in our State, a ready one is the number of joint-stock companies we are able to put forth from month to month. The joint-stock principle is the index of production on a large scale. It is ouly production on a large scale that can help towards increased production of wealth. In India generally, and in Mysore in particular, the joint-stock idea has still to take root. Much of our lack of progress is due to the non-recognition of this principle in the domain of production. Capital may be available; machinery may be available; men may be available; and other facilities required may be available. But the organizing ability that can put these different things together and render production on a large and wealth producing scale is one thing wanting. It is *the* thing that matters, however; and it is therefore of the first importance that we should pay increasing, nay, special attention to it. The effects of large scale production are many and various, not the least important are those which have regard to those actively taking part in it. "The stupendous increase of production which is thus rendered possible" says one authority, "reacts upon the labourer both as producer and as consumer. Population increases enormously, and there is continual drift from the country to the city. Industrial society receives its modern shape and the social income is divided into the rent of the land-owner, the wages of the labourer, interest of the capitalist and the profits of the entrepreneur." The joint-stock principle, therefore, requires the utmost extension in this country. It should be our aim to increase the number of joint-stock companies from month to month and

year to year. The need for this extension ought to be obvious to any one who cares to read the signs of the times. In Western countries post-war re-construction is taking shaping in divers ways. In the industrial domain, the growth of combination and organization is a marked feature. The competition that is sure to flow from this will be felt far and wide. The nations that are most progressive will thus get the first chance to succeed in their entreprizes. The world conditions are such that only those who possess the best organization will succeed. It is, therefore, necessary that no effort should be spared to spread the joint-stock idea in this State.

The number of joint-stock companies in the State is not great, and the yearly increase is negligible. The returns of the Director of Statistics in India show that Mysore figures the least in them. Take for instance the returns for December, 1918. During that month, 29 companies were registered with an aggregate authorized capital of about Rs. 1,19 lakhs as against 21 Companies with an aggregate authorized capital of Rs. 13,62 lakhs in the corresponding month of the preceding year. Beugal alone accounted for 19 companies (or Rs. 61 lakhs). For the nine months, April to December, 1918, the number of companies registered was 187 with an authorized capital of Rs. 7,93 lakhs, as against 183 companies with Rs. 22,33 lakhs of authorized capital in the corresponding period of the preceding year. The largest flotation in December was that of the Aerial Transportation Company of India, Bombay (Rs. 20 lakhs). Mysore State is conspicuous by its absence in these returns. Speaking generally, in India, over two-fifths of the companies in existence are in Bengal. Bombay comes next, where the cotton mills and presses are all run as joint-stock concerns. Close upon three-eighths of the aggregate paid-up capital thus invested India has been for the working of these mills and presses. In Mysore, the only important joint-stock concerns are those owued and run by Europeans. Their enterprize, their success and their steady work in their respective spheres ought to be an incentive to us. Just think of the coffee estates, the gold mines, the manganse mines and see how their work has been rendered possible by the joint-stock idea. Their very success ought to make us gird up our loins and see to the spread of this idea among our own people. In the domain of industrial development nothing is likely to give a real impetus as success and success is largely dependent on organized capital, organized skill and organized labour. The man who has brains but has no money has every chance to succeed if the joint-stock principle takes deep root in our soil. The man with little money has a chance to make it more paying to himself and more helpful to those who are more enterprizing than himself, this principle obtains a wider application in the State. We do think that the time is ripe for a step forward in this direction. The Government are doing what they could to provide expert help and laws that make for the absolute safety of property invested in joint-stock concerns and it is the bounden duty, we think, of the people to come forward and do their part of the duty. To begin with, we want, so far as we are concerned in this State, joint-stock companies for the following purposes:—Cotton mills to work our own cotton; woollen mills; mills for silk; mining; land and building; *gul* and sugar manufacture; paper; tramways and railways; leather work; saw and timber mills; furniture manufacture; quarrying; and rice and flour mills. In regard to the last two, there bas already been some enterprize visible but a wider survey will disclose that there is ample ground still left for energetic hands to work upon.

Another test of progress in the industrial field is the extent of loans obtained by the people of a place for trade and mercantile purposes. In this respect we are, thanks to

the Mysore Bank and those responsible for its working, making some real, though yet slow, advance. During the past five years the total amount advanced exceeded, from the published figures available, 8½ crores, while the bank's turnover ran up to 61 crores. These figures show the increasing volume of business done. There is still ample room for improvement. A great deal still remains to be done to develop the purely industrial side. It is here that the Bank's activities deserve to be developed. It should add to it an industrial side, so that genuine industrial *entrepreneurs* may not be crippled unduly in their enterprizes. Much more help ought to be forthcoming to these, if they are to flourish in the land. At present they are badly handicapped in a variety of ways and anything that can be done to improve matters ought to be very welcome to them. The Indian Industries Commission has laid down the main lines on which Government can render help in matters of the kind and it is to be hoped that our own Government will do the needful before very long. The more it is made easy for an *entrepreneur* to obtain the necessary pecuniary aid the better it is for all parties concerned. Loan means industrial activity. The war has demonstarted, despite its dark side, the truth of this common saying. It has enabled our people—as the people of other countries—to realize the possibilities of their own country. Many industries which were taken to be impossible in this country in the pre-war days were proved to be possible in it, if the proper impetus was forthcoming for it. In our own State the blanket industry is a case in point. Efforts should be made to not lose industries of this kind in peace time. In other words, war developed avenues of trade should be kept up and even strengthened. This is what they are doing in the advanced Western Countries and we think we ought to do the same. For instance, in Canada the Imperial Munitions Board spent—so we read in a Canadian manufacturers' journal—over a billion dollars in building up, equipping and operating seven national manufacturing plants on which $ 15,000,000 has been spent. It has built up a great airplane industry and an airplane engine factory, upon which millions are still being spent. The lumbering industry of British Columbia has been developed to an enormous extent, and the Board gave contracts for ninety ships costing $66,000,000. The Board has also put may of the Canadian exportable food products on such a footing that the benefit will last when the War has been forgotten. There has been, in fact, expansion in Canada in so many lines that the story of its progress during the War, seems incredible. So, it is, in a word, with many an other Western country. Even in India, the War gave an impetus to many industries which were either dormant or entirely dead until they were resuscitated by the necessities created by the War. The recent speech of the Indian Minister for Commerce in the Imperial Legislative Council fully confirms this. Even in Mysore, the same story has unfolded itself. As we have remarked, the blanket industry is a case in point. The duty is thus cast on us to keep such industries active by putting forth further effort. While the Government can be expected to do its part, the people should do theirs; otherwise, progress there will not be for many a decade to come.

Since December 2nd, 1918, says the British Ministry of Reconstruction, seven additional interim Industrial Reconstruction Committees have been formed in the following trades: (1) Artificial stone, (2) brass and copper, (3) women's light clothing, (4) lead-mining, (5) lead, (6) zinc and spelter, and (7) sugar refining. There are now twenty-nine of these committees at work, some of which are reaching the stage when they will be convertible into full Joint Industrial Councils.

MADRAS FISHERIES, 1917-18.

BY "RUSTICUS."

THIS is the first occasion on which the Annual Report of the Madras Fisheries Department has been reviewed in these columns and we are glad to have an opportunity of paying a small tribute to the valuable work which Sir Frederick Nicholson, its Honorary Director, is unostentatiously doing, not only in developing an important industry but also in improving the social and economic welfare of a very backward element in the community. There have been few, if any, members of the Indian Civil Service who have laboured so long and so disinterestedly on behalf of the people of this country after their retirement. It is now some nine years since Sir Frederick Nicholson virtually founded the Department. We trust that, before he finally relinquishes the reins of office, he will give us a connected history of it from the beginning for there is much in the report in regard to which a reader who has not seen previous reports would be glad to have more information. We have, for example, to confess our ignorance of the uses to which beche-de-mer is put nor do we know whether chanks can be utilised for any purpose other than the making of bangles.

Though the staff of the Department is small, its activities are numerous and varied. Perhaps the best known of them is the fishcuring and canning work which is carried on at Tanur and Chaliyam on the Malabar coast. The excellent products of the cannery have proved a boon to the district officer on tour especially since the war stopped supplies from Europe. It is not surprising, therefore, to find that the supply greatly exceeds the demand. Sir Frederick Nicholson hopes to be able to supplement it before long by the refrigeration of cheap shoal fish such as sardines and mackerel and freezing tanks have already been built at Tanur. If the experiment proves successful, fresh fish sharply frozen in ice and salt will be placed on the more distant markets whilst the nearer markets will get fish which has been kept fresh by simple chilling. Sir Frederick does not say whether there are any signs of private enterprise supplementing this branch of the work of his Department. It has already done so to some purpose in the case of oil and guano factories. No less than 253 of these have sprung up on the West Coast since the Department started operations there in 1908-09. Most of them have had a bad time of late owing to the war and the consequent absence of freight for their products but demands from the Munitions Board for oil for military purposes and from the jute mills enabled the oil factories to make a good recovery last year and the outlook for them is now very favourable. By bringing producers and consumers into direct touch and doing away with the almost inevitable but very expensive middleman, the Department was also able to get the price of guano back to its normal level to the great benefit of the guano factories.

Mr. Hornell, the Marine Biologist, gives an account of the work of the pearl and chank fisheries, which are much more concerned with chanks than with pearls. The fisheries had a moderately successful year only except at Ramnad, the strong winds making the sea too muddy for effective operations. Mr. Hornell is also engaged on many interesting lines of research. A study of Indian boat designs and of the physical characteristics of the chief fisher caste of the extreme south has led him to the conclusion that there is a strong infusion of Polynesian blood in the coast population of some of the southern and western districts of India. The Madras aquarium which is one of the most frequented buildings in the city owes much to him and it is to be hoped that, now the war is over, the construction

of the much larger building with a biological station and head-quarters for fisheries, which has been under contemplation for some years, will not be long delayed. One of Mr. Hornell's minor activities is the supply of educational type collections of shell-fish and crustaceans. It is curious that the demand for these comes mainly from the north of India. There seems no special reason why students in the north should show greater aptitude for Zoology than those in the south. Possibly the greater the distance from the sea, the keener the interest taken in its products.

The third main branch of the Department's work is the development of inland fisheries. Had it not been for the serious loss sustained by the death of Mr. H. C. Wilson, the Pisciculturist in April 1917, more rapid progress would have been made in the survey of the inland waters of the Presidency with a view to systematic stocking and culture. Several schemes are in progress for the utilization of the waters of big irrigation reservoirs such as the one at Mopad. An experiment which is worthy of mention is being made in fishing deep water tanks. As a general rule, the method of fishing tanks in Madras is to wait until the water is almost exhausted and then to capture all the fish at once. Obviously, if the tank does not dry up, this method is inapplicable and it remains unfished. The result is that where conditions are most favourable for the growth of fish, the fish are not forthcoming. The Fisheries Department is endeavouring to remedy this. Boats, nets and men have been engaged and the operations are supervised by the staff of the Department. They have, however, met with various and unexpected difficulties, the presence of weeds, the opposition of interested persons and so on.

The work of this branch has very important ramifications. Not only is it valuable in developing a source of food-supply and of revenue but it will, in time, bring about a marked improvement in health conditions. Some varieties of fish are natural enemies to the mosquito and as all children are now taught in schools, the mosquito is the natural enemy of man, as it is entirely responsible for the ravages of malaria. The realization of this fact has caused many local bodies to turn their attention to the stocking of tanks and wells with fish that prey on the larvæ of the mosquito and the Ippur fish farm is almost entirely engaged in supplying the demand for these. The Department itself has taken in hand the cultural and sanitary development of the Fort moats at Vellore and Chingleput.

We spoke at the outset of the social and economic work which is being done by the Department among the fisher community. Sir Frederick Nicholson was one of the pioneers of the co-operative movement in India and it was to be expected, therefore, that he would turn his attention to the possibility of co-operation. Apart from societies amongst fishermen organized by the Co-operative Departmeut, the Fisheries Department has already established ten credit and one productive society whilst several others are awaiting registration. The productive society has been formed by oil and guano producers in the Mangalore Taluk and it is hoped that its formation will mean not only increased production and better sales, but also better classes of goods as the society will refuse products not up to standard. Two Temperance Societies are doing good work and at Tuticorin and Rameswaram counter attractions to the toddy shop have been provided in the shape of coffee stalls at which coffee, tea, and country cakes are supplied at cost price. Educational work is also in progress but we are told nothing more than that general proposals have been made and concurred in by the Director of Public Instruction.

It remains to add that the Department more than paid its own way during the year, the receipts which amounted to just over Rs. 2½ lakhs exceeding the expenditure by Rs. 6,180. Considering how large a portion of the expenditure is devoted to research, experiment and supervision, this is a very satisfactory result. There can be no doubt that the fisheries of India are an important asset to the State and that money spent on their improvement and development is money well laid out.

AGRICULTURAL RECONSTRUCTION IN GREAT BRITAIN AND IRELAND.*

THE Agricultural Policy Sub-Committee of the Reconstruction Committee, appointed in August 1916, to consider and report upon methods of effecting an increase in the home-grown food supplies, having regard to the need of such increase in the interests of national security, has just issued its report which is a full exposition of the position of agriculture in this country. It opens with an historical preface which is a brief survey of agricultural conditions during the last hundred years and the political and social factors exercising and influence on them; and it proceeds to deal in detail with the various problems connected with British agriculture. A number of more or less drastic recommendations are made by the committee with the object of ensuring agricultural reconstruction.

The subject dealt with include:

(1) Effects of the agricultural depression; (2) Need for a new agricultural policy; (3) Agricultural wages; (4) Price of wheat and oats; (5) Effect of guaranteed prices on rents; (6) Method of securing increased production; (7) Sugar beetroot; (8) Scope and limitation of the inquiry; (9) The departments of agriculture; (10) Organization and co-operation; (11) Agricultural credit; (12) Small holdings, ownership, and tenancy; (13) Village reconstruction, village industries, and rural life; (14) Tithe redemption; (15) Local taxation; (16) The Agricultural Holdings Act; (17) Reclamation and drainage; (18) Deer forests; (19) The elimination of pests and weeds; (20) The supply of artificial manures; (21) Weights and measures; and (22) Transport.

*With acknowledgments to the *International Review of Agricultural Economics* of Rome.

It is not proposed to give here a summary of the whole report. The following verbatim abstracts of some of its principal parts will afford an idea of the committee's views and recommendations.

INTRODUCTION.

"We desire at the outset to explain that we were informed that the question asked us did not refer to war but post-war conditions, and our report is drawn up from that point of view only. Nevetheless, it is evident that for some time after the war agriculture must be seriously affected by the conditions which have prevailed during the war. Any inducements and assistance, which the farmers receive now to keep their fields cultivated or to cultivate additional land, will bear fruit in the post-war period, and may even be considered as direct steps towards the object we have in view. We trust, therefore, that we shall not be considered to have passed beyond our legitimate subject when we express our conviction that farmers need and deserve all the help and encouragement which His Majesty's Government can possibly give them at the present time.

"The experience of the war has shown that the dependence of the United Kingdom on imported food has already involved the country in special difficulties, and in the future may become a source of real danger. We have found that it has increased the cost of the war; aggravated the difficult problem of regulating foreign exchange; and absorbed an undue proportion of the tonnage of the mercantile marine at a time when its services have been so sorely needed for other purposes. We are conscious also of the possibility of a development in the construction of submarines which in a future war might make impossible a continuous supply of food to the people of the United Kingdom from overseas. We hope and pray that the greater sanity of nations and their increased obedience to the Divine law may

save our country from any repetition of the hideous catastrophe which has to-day overwhelmed Europe, but we can feel no positive assurance that this will be the case, and we do not think that we should be faithful to our trust for our descendants if we omitted to take any practicable measures to increase the national safety in a future time of need. We can well imagine that in some future struggle the comparative independence of the United Kingdom of a supply of food from overseas might be a determining factor of victory. Apart from these grave considerations, it is evident that, after the war, the financial and physical welfare of the country will demand that the productive capacity of the soil should be developed to the fullest extent. Burdened with a huge debt, the nation will be strongly interested in producing as much as possible of its food at home, in order that it may buy as little as possible abroad. Exhausted in man power, it will find in the expansion of the rural population of these islands the best restorative of its vitality and creative energy.

"We have approached the problem entrusted to us exclusively from the point of view of national security and welfare, and we have endeavoured to formulate a scheme of agricultural policy which may be generally accepted by the nation and adhered to through a long course of years".

Need for a New Agricultural Policy.

"We are confident that, as the years pass by and agriculture becomes more intensive in the United Kingdom, an increase of production will be reached which would now appear impossible to many farmers, and that, if the agricultural policy which we recommend is carried out steadily and continuously, a great change will be effected within a generation.

"Nothing in agriculture can be done by the wave of a magician's wand. Results can only be produced in the United Kingdom as in Germany by a constant and consistent policy. The State must adopt such a policy and formulate it publicly as the future basis of British agriculture, and explain to the nation that it is founded on the highest consideration of the common weal. It must be explained to landowners, farmers, and agricultural labourers alike that the experience of this war has shown that the methods and results of land management and of farming are matters involving the safety of the State, and are not of concern only to the interests of individuals. They must be plainly told that the security and welfare of the State demand that the agricultural land of the country must gradually be made to yield its maximum production both in foodstuffs and in timber. The history of our country shows that, when once the path of duty is pointed out to them and they understand how grave is the responsibility put upon them, neither landowners nor farmers nor agricultural labourers will fail to rise to the emergency.

"There is much excellent estate management and much high farming in the United Kingdom to-day, but there is also much slack estate management and bad farming, or management and farming which, while profitable to the persons interested, do not take national requirements as to food production into account. That this is so is known to all who have studied the present conditions of British agriculture. The causes of bad estate management and farming are lack of suitable education or of capital (often found in combination) on the part of landowners and farmers, the personal equation of character, the excessive encouragement of game, the acquisition of land for the sake only of its amenities, and the conviction that the State has no interest in the treatment of agricultural land and that it is the concern only of the individuals dependent upon it.

"The general average of farming must be steadily and continuously raised throughout

the United Kingdom; the grass land and the arable land alike must be more intensively cultivated; the improvement of livestock, for which landowners and farmers have done so much even through the years of acute depression, must be progressive; much grass land must be reconverted into arable; the sugar beet industry and the manufacture of potato products can be introduced into British agriculture to its great advantage: estates must be managed with a single eye to maximum production; capital must be attracted to the industrial equipment and improvement of the land and to the operations of intensive farming; agricultural labonrers must be provided with an adequate supply of good cottages; small holdings both of owners and of occupiers must be fostered to provide a "ladder" for the agricultural labourer and for the demobilized sailors and soldiers; the organization of agriculture must be developed; the country must be permeated with a complete system of agricultural education: the status of the department of agriculture must be improved and their powers enlarged and reinforced by association with existing agricultural and administrative bodies, both national and local. All these questions and others of much importance, such as reclamation, the incidence of local taxation, credit, the working of the Agricultural Holdings Act, etc., etc., will be dealt with in our report, which will present a scheme of agricultural policy as one whole; but we think it our duty to put in the forefront our conviction that a basis of security and stability of the conditions under which agriculture is to be carried on in the future must be the foundation of the whole structure, and that without it the increase of production, which we predict, cannot be realized.

"We are of opinion that the conditions of agriculture must be made so stable that out of its profits the agricultural labourer can be assured a fair wage, the cultivator of the soil a fair return for his capital, energy, and brains and the landowner a fair return for the capital invested in the land, and we believe that this stability can never exist so long as there is a possibility of a recurrence of the prices of the late period of depression.

"We recommend that the State should fix a minimnm wage for the ordinary agricultural labourer in each country, guarantee to the farmer a minimnm price for wheat and oats, and take steps, as set forth in later paragraphs, to secure the increase of production which is the object of the guarantee. The cereal crops are the pivot of agriculture, and we do not consider that dairy and stock farming will in any way be prejudiced by our propesals. Moreover, as we have already stated, these very important branches of the agricultural industry can be more, not less, advantageously conducted on arable land than on grass land. In the United Kingdom there is land so adapted to pasture that its retention in grass can be defended on economic grounds. There is also grass land the soil of which is a clay so sticky that in the climate of these islands under the plough "season can only be got upon it" once in three or four years; and there is other land where the climatic conditions render the harvest precarious. It would be useless to plough such land. Of the remaining grass land a large proportion could be ploughed up with advantage to the farmer, the landowners, and the State. The interests of the State demand that more land should be put under the plough, and any landowner and dairy or stock farmer, who chooses to convert part of his grass land into arable, could at once obtain the benefit of the guarantee and at the same time increase the output of his particular products.

"We have no authority to consider the fiscal policy of the country as a whole; our reference, though a very important one, is strictly limited, and we shall confine our report to an answer to it. At the same time

we think it right to put on record our opinion that if the State, for reasons of general policy, were to adopt a tariff on manufactured goods, then a tariff corresponding in degree (with the necessary differentiations between the products of the empire, of allied, and of other countries) should be imposed on imported foodstuffs such as dairy produce, meat and corn, and that special consideration should be shown to the produce of the more intensive forms of agriculture (of which fruit and hops and flax may be cited as examples), where the capital invested and the annual expenditure in cultivation and the proportion of that expenditure on labour, are particularly large."

METHOD OF SECURING INCREASED PRODUCTION.

"The government has no fairy touch which will enable it to produce instantaneous results. It must work through, and by means of, the men who are now holding and cultivating the land. If it was so foolish as to try and do their work as well as its own, the only result would be to bring agricultural production to a standstill. There is no body of men in existence except the farmers of the United Kingdom and those who have qualified, or who are qualifying, to become farmers, who are capable of farming the land. Technical knowledge based on experience is just as essential for successful farming as education and brains and capital. It is when all these qualifications exist in combination that the best farming is found. Therefore the State must give time to all concerned to adjust themselves to the new conditions dictated by considerations of national safety. It should formulate its policy and explain the reasons for it in simple definite terms; it should make clear the part it proposes to play itself, that the policy explained will be steadily and consistently followed, and that, while the policy is being worked out the agricultural industry will not be subjected to any harrassing legislation. The State must, in short, take every means in its power to give confidence and a sense of stability to landowners, farmers and agricultural labourers. It must then tell those classes exactly what is expected of them, and appeal to their highest instincts of patriotism to put personal predilections aside, and to unite to carry out a policy on the success of which the safety of their country may some day depend. The standard set before their eyes should be the highest—not to be content till the whole soil of the United Kingdom is producing the greatest possible return of foodstuffs or of timber. It must be clearly understood that henceforth bad farming is a danger to the State, and that the waste of good land on game or games is inconsistent with patriotism. There will be plenty of room for game or golf in moderation, but too much game, or golf links carved out of fat land, make an inroad on the production of foodstuffs which can no longer be defended. Rabbits must be recognized to be what they are, a curse to both agriculture and forestry. There are localities where the rabit defies extermination, but the effort to deal with the pest should never be intermitted. The theory in fact should be that rabbits are only to be tolerated in completely enclosed spaces, where the ground is of such a nature that it can more advantageously be devoted to the production of rabbits than of any other foodstuffs.

"When all this has been explained to them, landowners and farmers should be informed that they will be given reasonable opportunity to adjust themselves to the new conditions. The agricultural labourers being secured their share of profits by the institution of a minimum wage, the landowners and the farmers may be left to adjust their shares between them and also to come to an agreement (which is essential) about the relaxation of covenants against the ploughing of grass land or of any others which tend to discourage good farming. We are satisfied that they will have no difficulty in doing

so much more satisfactorily than the State could for them.

"We entertain no doubt that landowners, farmers and agricultural labourers alike will realize the greatness of the trust reposed in them, that they will rejoice at the recognition of the fundamental importance of agriculture to the national life, and that they will do all, and more than all, that their country demands of them. But we recognize that, when once the State has embarked on such a policy as we recommend, for the sake of the nation's safety, it can run no avoidable risk of its failure. Neither the idiosyncrasies nor the incapacity nor the lack of patriotism of individuals can be allowed to interpose even a partial barrier to the success of a national policy..........."

NEW POWERS FOR THE BOARD OF AGRICULTURE.

"We recommended that the Board of Agriculture should be empowered temporarily to supersede the landowner in the management of the estate for all purposes essential to agriculture. It should put the estate, or such portion of the estate as it might deem necessary (except the mansion and the garden and park, if any, attached to the mansion), into the hands of a manager whose salary should be fixed by the Board of Agriculture and made a charge upon the estate. He should have the same powers in respect of the management of the agricultural land included in the estate as the owner had, and he should manage the estate as trustee for the owner. He should be a man of proved experience and capacity in the management of an agricultural estate, and he should render a yearly report and statement of accounts to the owner and to the Board of Agriculture. The balance of income, if any, derived from the estate after the payment of the necessary outgoings should be remitted half-yearly to the owner by the Board of Agriculture. When once the management of an estate had been so taken over by the Board of Agriculture, it should retain that management for five years, unless within that period there had been a successor in title to the original owner, in which case the estate should be handed back to his management at the end of the current farming year, if he so desires it and is prepared to accept such liabilities as may have been incurred in connection with it. If there had been no change of ownership within that period, the Board of Agriculture should be empowered to hand back the estate to the original owner at its termination if it was satisfied that the future management of the estate would be satisfactory. If it was not so satisfied, then it would continue to manage the estate for another quinquennial period, and so on from five years to five years, until there had been a change of ownership. The owner should throughout be undisturbed in the exercise of sporting rights over the estate, subject to the power of the manager of the estate to prevent those sporting rights being exercised in a manner detrimental to agriculture or forestry. If the owner of such an estate is unable or unwilling to develop it for the purpose of agricultural production, the Board of Agriculture should have the power to borrow from the Land Commissioners and to develop it for that purpose by the expenditure of capital, the charges for which (interest and sinking fund) should have priority over all existing charges on the land charged according to the principle embodied in the Improvement of Land Act, 1864. During the period of supersession the power of the owner to make any fresh charges on the estate, or part of the estate, should be suspended, and the existing charges on it, whether by way of mortgage or of settlement, should be paid out of the proceeds of the land by the Board of Agriculture.

"For the guidance of all concerned it should be laid down that it shall be the duty of every landowner so to manage his estate, and that it shall be an implied condition in every lease or tenancy agreement, that the

tenant of agricultural land shall cultivate the same according to the approved practice of the best agriculture, with a view to the economic production in the interests of the community of the greatest amount of foodstuffs (for man or beast) of which the land, having regard to its quality and position, is reasonably capable.

"Where land is being badly farmed by a tenant who holds a lease, and who persists in farming badly after being duly warned of the ultimate consequences, the land-owner may bring the case before the Board of Agriculture, at the same time giving formal notice of the action to the tenant. The Board should thereupon ask the local panel to appoint assessors resident in another county than that in which the farm is situated to report upon the farm, and in due course should refer their report to the Review Committee. If, as the result of the unfavourable nature of the report in respect of the farming of the land, the Review Committee so recommended, then the Board of Agriculture should be empowered to call upon the landowner to give twelve months' notice to the tenant to quit, and that notice should have effect as if the tenant had held no lease, but was a tenant holding on a yearly agreement.

"In the later part of our report we shall deal with agricultural organization in all its aspects, but it is advisable to state here that in our opinion the Agricultural Department in each county should, in carrying out the duties described in this part, act in constant consultation with a National Agricultural Council or Board, which we hope may be formed so as to represent the progressive agricultural thought of the country and fulfilling analogous functions to those exercised by the German Agricultural Council" *

RURAL COTTAGES.

"The provision of good cottages for agricultural labourers with ample gardens attached to them was an urgent question before the war. We desire to impress upon His Majesty's Government with the greatest emphasis at our command that there can be no hope of a satisfactory development of agriculture as long as the demand for cottages remains unsatisfied. The provision of these cottages should be taken in hand without a moment's avoidable delay after the war. In another part of our report we shall deal with the improvement of the amenities of rural life, the reconstruction of stagnant villages, and the provision of an agricultural "ladder" for the labourers by means of small holdings. We mention these subjects now lest it should be supposed that we consider that the interest of the labourer in a national agricultural policy is limited to the questions of wages and housing.

"Our attention has been directed to the point that some amendment in the Settled Land Acts may be desirable to allow a share of the proceeds of the sale of a portion of a settled estate, to be expended on improvements other than those specified in the existing Acts......"

NEED FOR TECHNICAL ADVICE.

"To bring about the changes in farming which we contemplate it will be necessary for the State, in addition to providing farmers with security against loss, to place at their disposal the best available scientific and practical advice. Indeed, it will be impossible to carry out the scheme (except with serious loss and wastage) unless it is accompanied by an important development of the facilities at present available in the United Kingdom for agricultural education, technical advice, and research. It will be necessary to insist on the importance of drainage, and to demonstrate throughout the country the best means of converting grass land to arable, the best methods of manuring, and the best varieties of seed; and to carry out on a much more complete system than has hitherto been attempted demonstrations devised to show that increased

* See MIDDLETON: The Recent Development of German Agriculture.

production can be secured without loss of profit. These subjects are, however, of such importance that we are deferring their consideration until the later part of our report."

ORGANIZATION AND ADMINISTRATION OF THE DEPARTMENTS OF AGRICULTURE.

"The first thing necessary after the war will be to unite the whole department of agriculture under one roof. Proper administration is quite impossible when a department is scattered into a dozen separate houses in half a dozen different streets. The minister in charge of the department should be styled, as now, President of the Board of Agriculture, but his salary and status should be raised to an equality with that of the President of the Board of Trade and the President of the Local Government Board. The staff must be increased and strengthened; especially it neeeds the infusion of a proper proportion of Class I of the Civil Service; those members of the staff from whom expert, or at any rate practical, knowledge is required should be selected by a combination of the systems of nomination and examination; the First Divison men, who enter through the Civil Service examination, should spend at least two out of the first five years of their service out of London; it is in our opinion important that they should get an early insight into the working of agricultural administration, either on the provincial staff of the department or attached to the staff of local authorities. The provincial staff of the department requires re-organizing. Before the war the work of most of the provincial officers covered an impossibly large area, but many fresh appointments have since been made in connection with the campaign for food production; in some cases officers may be made responsible for all the work of the Board in a given geographical area; in other cases the work of officers must be specialized. In this paragraph of our report we merely indicate the fact that the staff of the department must be permanently expanded above its pre-war strength. In subsequent paragraphs we shall explain what the work is which in our opinion it should do. It may, however, be convenient in this place to draw attention to the fact that the work of other departments of the State must affect the welfare of the rural population and the state of agriculture. This is particularly true of the Board of Education, and of the Local Government Board in respect of the housing problem. It seems to us necessary that in dealing with rural housing the Local Government Board and dealing with elementary and secondary education in agricultural districts the Board of Education, should work in close touch with the Board of Agriculture. The organization of the department in London must be remodelled in the light of experience and in consequence of its increased reponsibilities. There is, however, one aspect of this re-organization to which we wish to draw special attention. It will certainly be necessary to create a division charged with the management of all agricultural properties permanently or temporarily placed under the control of the Board of Agriculture. But the President of the Board, in his capacity of a Commissioner of Woods and Forests, is already responsible for the management of the agricultural properties of the Crown. We think that it would be a good plan to amalgamate the agricultural side of the Office of Woods and Forests with the Management Division of the Board of Agriculture, and to put both sets of agricultural properties under the same control.

"As in Scotland, so in England and Wales, the War Agricultural Committees of the Country Councils * should be replaced by.

* Since this paragraph was drafted the Board of Agriculture has been empowered under the Corn Production Act to authorize approved bodies to exercise any of the powers of the Board under Part IV. of that Act, with a proviso that the bodies so authorized shall, in the first instance, consist of persons who are acting as members of the County War Agricultural Executive Committees. This enactment, therefore, provides a natural link between the Statutory Committees here recommended and those already in existence.

statutory committees, which, when constituted, should have powers of action independently of the County Councils, as in the case of the corresponding committees in Ireland and of the Education Committees in England. They should be composed of men and women who are not members of the County Councils, as well as of members of the County Councils, but in both cases alike it is essential to secure the services of persons with practical knowledge of agriculture or some other branch of rural economy, or representative of some special rural interest rather than of the different districts of the country. These Agricultural Committees should absorb the work of the existing Small Holdings and Allotments, Contagious Diseases of Animals, and Agricultural Education Committees (or Sub-Committees) of the County Council, and of the Live Stock Committees established by the Board of Agriculture in various counties within the last few years (all of which committees should be abolished), and they should undertake any other duties entrusted to them by parliament or delegated to them by the Board. A County Council should have the power to set up more than one Agricultural Committee within its area, and the Agricultural Committee should have power to form District Sub-Committees.

"The Agricultural Committees of England should elect two representatives from each County Council area to serve on the English National Agricultural Council, already suggested in this report. The President of the Board of Agriculture should nominate to it persons representative of all agricultural interests, so that, however, the total numbre of nominated members shall not exceed one-third of the council. The President and the Parliamentary Secretary of the Board of Agriculture should be *ex-officio* members. The council so composed should meet at least twice a year to discuss questions of agricultural policy brought before it by the president, or by any of its members on due notice given, and the president or, in his absence, the parliamentary secretary should preside over its meetings.

There is already in existence a Welsh Agricultural Council which is not statutory but does useful work. We recommend that this council should continue to perform the functions of a national agricultural council for Wales, and that it should be made a statutory body for the purpose of advising the Board of Agriculture in regard to agricultural matters in Wales, to which the Board may delegate certain powers and functions relating to local administration. The council should consist as at present of two members elected by each Agricultural Committee in Wales and Monmouth and the agricultural departments of the two colleges, with not more than twelve members nominated by the President of the Board of Agriculture. The President and the Parliamentary Secretary of the Board of Agriculture should be *ex-officio* members, aud the President or, in his absence, the Parliamentary Secretary should preside over its meetings. All the local work of the Board of Agriculture in Wales should be under the charge of a Principal Officer of the Board, who should be assisted by an adequate staff and have his head-quarters and office at a centre in Wales convenient for North and South.

" We recommend also that there should be established an Agricultural Committee for England and Wales, composed of the President and Parliamentary Secretary of the Board of Agriculture, eight members elected by the English Agricultural Council, two members elected by the Welsh Agricultural Council, and three members appointed by the President of the Board of Agriculture. The committee should meet regularly every quarter, and on special occasions when summoned. The president or, in his absence, the parliamentary secretary, should preside. It should deal with any business brought before it by the president, but its members should be free to raise and discuss and pass resolutions on any subject of

interest to agriculture or rural life in England or Wales. The proposed annual estimates should be laid before the committee and discussed by it before being laid on the table of the House of Commons, and when so laid they should be accompanied by a memorandum expressing the opinion of the committee upon them. All resolutions of the committee should be laid upon the table of both Houses of Parliament if so directed by them.

"The National Agricultural Councils for Scotland, England, and Wales, and the Agricultural Committees for Scotland and for England and Wales, should be appointed afresh after every general election of the county councils; and the members selected, whether by the county councils, or by the Presidents of the Boards of Agriculture, or by the National Councils, should hold office nntill the next general election of the county councils.

"If our recommendations are adopted there will be in existence in the United Kingdom four National Agricultural Councils, representing agriculture in Ireland, Scotland, England, and Wales. We suggest that it would be of great advantage to agriculture if delegates from these councils, say, thirty for England and five for Wales, and ten each for Scotland and for Ireland, were to meet in conference once a year. The conference should never be held two years running in the same country, but in each country in turn, and the minister responsible to parliament for the agriculture of the country in which the conference is held should act as its president for the occasion. An officer of one of the departments of agriculture should be permanent secretary of the conference, and responsible for the custody of its records. We believe that the result of such conferences would be to diminish the chances of friction between the three departments, to encourage the pursuit of a common policy, and to inform public opinion of the special difficulties and needs of agriculture and of its magnitude and importance as an industry. It would be a great encouragement to agriculture if His Majesty the King would graciously consent to become permanent patron of the conference of the combined couucils."

EDUCATION OF WOMEN.

"Before quitting the subject we have something special to say about the education of women who can play a great part in the reconstruction of agriculture after the war and whose intellectual interest in country life must be surely aroused if we wish to secure an increased rural population. We hope that numbers of the women who have been working on the land during the war will wish to remain in agricultural occupations and to avail themselves of the openings which will be presented to them in many branches of farming, such as dairying in its various forms, pig-breeding, and poultry keeping. We hope that every possible encouragement will be given to women so disposed and that the agricultural colleges will see to it that their courses are made suitable to them, and that the posts of lecturers are as open to fully qualified women as to men.

"The subject has already been fully dealt with in the report (1915) to the Board of Agriculture and Fisheries of the Agricultural Education Conference (Agricultural Education for Women), which did such a great service in stimulating an interest in agricultural education. We desire to express our complete concurrence with the following reflection extracted from paragraph 2 of the report: 'It is between 14 and 16 years of age that so many of the girls brought up in rural districts at present lose touch of country life. No matter what facilities for agricultural education may be offered to them later, these girls will have neither the taste nor the aptitude for it. This is a matter for serious consideration in view of the fact that it is women no less than men who are responsible for rural depopulation, and

that there is no inducement in the form of higher wages which will tempt them to return.' The fact is that the local conditions which have brought about rural depopulation, bad housing, low wages, lack of prospects, affect women even more than men, and that the influence of women might be exerted in the opposite direction if they had been taught to make more comfortable homes with less drudgery, and if they had the necessary knowledge to enable them to build up a social order in which the natural advantages of country life could be made to counterbalance the artificial attractions of the town."

PURCHASE OF LAND BILL.

"We recommend that the principles of the Purchase of Land Bill should be adopted and an Act passed to give effect to it. We attach special importance to clause II of the Bill, which prohibits sub-division and sub-letting and we strongly advise that the principle of this clause should form an integral part of any purchase scheme."

VILLAGE RECONSTRUCTION, INDUSTRIES, AND SOCIAL LIFE.

"The intimate connection between a plentiful supply of agricultural labour and an increase in the output of home-grown food—the primary object of our reference—was recognized in the early stages of our enquiry, and the recommendation with regard to farm wages contained in Part I. of our report was framed to meet the competition of other and better paid industries. But, in our opinion, the question is not merely one of wages; the conveniences and interests of town life exercise an attraction upon the young rural labourer which can only be met by offering counter attractions in the country districts; and no agricultural policy will be worth having which does not aim at a better developed social life in our villages, at the introduction of fresh industries into the country districts, and at a large increase in the rural population. To this end an effort must be made to break through the stagnation in the life of too many villages by offering better opportunities for social intercourse and amusement, by arousing a stronger feeling of corporate existence and responsibility, and by opening out improved prospects of advancement to the energetic and hard working. With the advance of education a desire for greater opportunities has arisen among the more active and ambitious of the younger generation, causing them to covet the greater scope for their energies offered in urban districts. The proposals made under this head of our report are designed to lessen the despondency of outlook sometimes associated with existing conditions and to provide a machinery, which does not at present exist, for the improvement of village life.

"The difference between villages, even in the same neighbourhood, is often marked. Some seem to carry outward evidence of the prosperity and happiness of their inhabitants, while the aspect of others, less fortunate, seems to indicate with equal plainness a dull and colourless outlook. In the former are seen smiling gardens, well cultivated and conveniently situated allotments, cottages in good repair, village playgrounds, and social clubs and reading rooms; in the latter, with land in abundance around, we find cottages possessing no gardens or insufficient gardens, huddled together so as to reproduce some of the evils of town slums, and absence of all the amenities of life, and allotments so distant from the centre of the village as to be difficult of access and inconvenient for cultivation, the whole presenting an appearance indicative of the conditions prevailing therein. Enquiry will usually show that the difference is due to the fact that in one village a guiding spirit has exercised a sustained policy of development, based upon a clear perception of the requirements of the inhabitants and a study of the best means of providing for them, while the other has been without these advantages. In this connection it has been pointed out that an examination of the maps

of the Ordnance Survey reveals how lacking in system has been the development of the ordinary village. In its midst, even adjoining the village street, may be often found land let with large farms, which might better be used for housing or other public purposes, for providing gardens, cow pastures or allotments, or for occupation with adjacent cottages. But it is no one's business to take the lead in demanding a better scheme of use for the land, nor does any machinery exist by which a rearrangement could be carried out. An atmosphere of stagnation prevails, and it is not surprising that the best men in such districts prefer to try their fortune in places offering greater scope for their ambition. The less efficient remain, and the deterioration in the rural working population, of which complaint is often made, becomes an accomplished fact.

"We are of opinion that the machinery of the Parish Council, the Agricultural Committees of the Country, and the Board of Agriculture should be utilized for the purposes of village reconstruction, and that under proper conditions the necessary land should be acquired by compulsory powers if it cannot be acquired by voluntary agreement. If cottages are built or small holdings are created, we think that the inhabitants of the village should be given the option of tenancy or ownership, but that ownership should not carry with it the power of subdivision or of utilization for a different purpose than that for which the house was built or the holding created. The money required for a scheme should be advanced out of public funds, and repaid by the parish council and the parties benefited, following the exact analogy of a scheme under the Small Holdings and Allotment Act, 1908.

"We have been much impressed with the value of the work done by the Rural League in establishing villages industries and of the Agricultural Organization Society in establishing women's institutes and we recommend that either the Agricultural Organization Societies in the three countries or some analogous body should receive distinct grants for these specific purpose, and that the task of fostering village industries and of forming women's institutes should be entrusted to them under the supervision and control of the respective departments of agriculture."

ECONOMICS IN THE WEST.

A New Era.

London, 21st Nov. 1918.—After the long night the dawn: after the greatest war in history reconstruction on a colossal scale. We are witnessing the opening a new era and of one which must profoundly affect the bases of our economic life. It is not merely that the unexampled ravages of war have to be repaired, the finances of a period of unparalleled expenditure restored to equilibrium, but that new hopes and new forces have been called into play which must change much, and perhaps nearly everything, in the old World rapidly disappearing below the horizon. I do not refer here so much to political as to economic influences. The war with all its bloodshed and horror has not been without its compensations, and amongst these is the spirit of invention it has called into play. Evoked primarily by the military exigencies of the time this has brought into existence many new appliances and processes which will be of incalculable service in the promotion of the arts of peace. And it has also permitted the intensive development of not a few activities which in ordinary peaceful times would have had to undergo a necessarily slow and expensive stage of experimental service. Sanitation, surgery, agriculture, locomotion, engineering, applied science—all have benefited. But the greatest factor of all which emerges from the welter of war is the conquest of the air. The aeroplane, a few years ago little more than a mechanical toy is to-day one of the great features of our practical civilisation. Distance has been annihilated in the war by aerial flight in a way which makes not only possible but probable that the ends of the earth will be reached in a period of days not greater than the weeks which are now required for communication. I anticipate that before many months are

out we shall have a regular air service to India—aeroplanes carrying mails and even passengers from London to India in two or three days. Think what this means for the future relations of the East and the West! Every department of life will be invigorated by this new and inspiring influence. We shall enter upon the new World which Peace has opened up with the old barriers imposed by distance broken down and that close inter union made possible which is the best antidote to distrust and enmity.

Message of Hope.

Probably to no part of the world does the new order carry a greater message of hope than to India. The lessons of the war plainly revealed in our industrial and commercial life here at home are even more conspicuous in your country. You cannot if you would sink back into the old apathetic attitude which was shown by rulers and ruled to the needs of Indian industry. The splendid services which India has rendered in the provision of the equipment of war shows that she has the power as well as the means to take a great and even leading place in a reconstructed world in which the arts of peace will be predominant. Her inexhaustible mineral resources, her wealth of the essential raw materials of modern industry, her docile and teachable population, and her means of developing power on a gigantic scale and in an economical way all give her advantages which if rightly used must win her success in the future as an industrial country. By what means she shall attain this position it is for the experts to determine. The Industrial Commissions' report makes many helpful proposals and if the lines it suggests are followed a great deal will have been accomplished. But after all it is the action of Indians themselves which will be the decisive factor. If they are prepared to equip themselves by education and training, as they must be equipped if they are successfully to compete with other nations, they will win through; but if on the other hand, they drop back into the old rut in which they made their way through life in the old easy going times when a Government appointment or a pleadership was the goal of the ambition of the intellectual youth of India, they will not secure for their country the position to which it is entitled amongst the commercial nations of the world.

Disposal of War Stores.

Not the least of the problems with which the Government is faced in the time that lies before it is how to dispose to the best advantage of the immense war stores which have been accumulated. In the House of Commons the other day an official speaker gave the value of these stores at £500,000,000. Imagination fails to grasp what this figure means when reduced to terms of stock—to the innumerable appliances machinery and goods which are in custody of the war departments. Much of the sum no doubt covers the splendid equipment of the munition factories which are to be found in every part of the kingdom. A considerable amount represents raw material and transport vehicles and appliances. For a very large proportion of the whole there will no doubt be an excellent use found in the reconstructed commercial system, but there will still remain a surplus for which a market will have to be found abroad. Motor vehicles particularly will be found at the close of the military operations in such numbers as to require for the exhaustion of the supply a very heavy demand from abroad. Here seems to be the opportunity for British territory outside the United Kingdom which is in need of road transport. There is nothing finer of the kind than the British motor lorries and there should be ample room for them in a country like India whose magnificent distances call for the employment of transport on the largest scale. It is the case no doubt that the Government of India has a large surplus of war stores of its own to dispose of, but even so there will be room when it has all been sold for some portion of the splendid fleet of motor vechicles which the Imperial Government possesses and for which it must find a purchaser. A point to be remembered is that these motor conveyances will be purchaseable at a price far below the scale of charges which will obtain in private industry for a very long time to come. Moreover, if sold to foreigners they will help to

strengthen the competition which we shall have to meet in the difficult times ahead.

AERIAL BUSES.

Apropos of what I have written about aerial developments I may refer to an interesting interview which appeared in last Sunday's *Observer* on the subject of "Aerial buses." The person interviewed was Mr. Holt Thomas who has come into prominence of late in connection with the proposed scheme for instituting an aerial passenger service between London and Paris. Mr. Thomas outlined plans which embrace a world wide aerial mail service, establishing services with Italy, France, Norway, India and South Africa with a chain of aerial stations extending at intervals of every ten miles all over the world. The machines used for this work will be the famous weight carrying flyers which have come into prominence of late in connection with the bombing of German towns. These planes fly 128 miles an hour, carry a weight of 3,250 lbs. and climbs 5,000 feet in five minutes. On the question of actual flying speed under new conditions Mr. Thomas made some interesting remarks. He said:—"In the paper I read before the Royal Aeronautical Society in May, 1917, I took as a safe actual speed eighty miles an hour. We could, I think, now take 100 miles, as we have machines doing 130. But taking the same figure, of eighty miles an hour, Rome can be reached by aerial service in twelve hour and a half from London instead of forty-two hours by the quickest route before the war, and Constantinople in twenty hours instead of in seventy-two. At the same speed, which I think is under-estimated on to-day's conditions, Bombay is about two days' journey hy air from London and Tokyo four or five days." It is hardly necessary to comment on this statement. It so eloquently tells its own tale of what we may expect in the future. But I may add that our occupation of mesopotamia will enormously facilitate the establishment of aerial communication with India. In the Euphrates Valley we shall find ideal sites for our aerodromes and a direct line between London and Bombay passed down this valley. As to passenger traffic the fact that the aerial route will be about 1,000 miles shorter thau the sea journey will inevitably tell in its favour.

ARNOLD WRIGHT.

INDUSTRIAL NOTES FROM THE UNITED STATES.

Making a Telescope out of a Camera.

Washington, D.C., U.S.A., 12th December, 1918.—Few camera owners are aware that they possess in their instrument the essential parts of a telescope—namely, a small lens in the view finder to serve as an eyepiece and the photographic lens to serve as an objective.

Remove from the finder the small lens found there, the focal length of which is usually about ·8 of an inch. Unscrew the front component of the photographic lens system. This can be done while the camera is "loaded." Choose the distant object to be observed; then, holding the finder lens close to the eye bring the photographic lens into alignment with the finder lens and the distant object, moving the photographic lens slowly to and fro until the distant object is seen, sharply defined and magnified. Adjustment is easily maintained if the hands grip a small stick. The magnification depends upon the focal lengths of the two parts of the telescopic combination. For distant objects the magnifying power is obtained by dividing the focal length of the photographic lens by the focal length of the finder lens. The focal length of a lens is the distance from its center to the point at which a system of parallel rays will come to a single point or focus. This distance is easily found with sufficient exactness by using the lens as a burning glass in sunlight and measuring the distance from the lens to the burning point, or image of the sun.

On popular types of camera the front lens often has a focal length around 12 inches. When used with a finder lens of ·8-inch focal length the improvised telescope thus has a magnifying power of 15 diameters, and an object 15 miles away, therefore, appears one mile distant.

In the less expensive cameras no component of the photographic lens is readily detachable, and films or ground glass, as the case may be, must be removed, leaving the back of the camera open. To use as a telescope, the camera, with shutter wide open, is pointed at the distant object, and the finder lens is held before the eye at the rear of the camera.

Since converging lenses are used in the finders, an astronomical type of telescope results, and objects are seen inverted—a feature which, it is said, is not necessarily confusing. To avoid this one may, if he wishes, carry in his pocket a small deverging or concave lens. Using this instead of the finder lens he will obtain an erect image as with an opera or field glass.

American-made Indigo Solves Dye Problem.

Indigo, the key to the dye situation in this country, now is being produced in the United States in commercial quantities, and the solution of the American dye problem—acute since the imports from Germany were cut off—has been found. Not only is America now independent of Germany, but we are rapidly moving into a position to hold the dye trade of the world, or at least the dominating place in that trade.

The dye problems have been solved, and United States laboratories are at this moment turning out synthetic indigo of the best quality on such a large scale that the commercial success of the undertaking is quite assured. As a matter of fact, the laboratory problems were all solved long ago. The manufacturing difficulties now have been overcome, and the production of this most important factor in the dye industry is going along according to the most up-to-date process. Not only is indigo being made in large quantities, but plants are turning out all of the intermediates necessary for its production. In a very short time the United States indigo plants will be brought to their full capacity, which will supply all of the needs of the United States and Canada.

In addition to the production of this indigo, a largely capitalized corporation soon will be manufacturing types of the finest basic, acid and direct colors, and a little later will put on the market the alizarine colors with their mostly needed derivatives—namely, the vat colors. Sulphur colors and chrome colors will be put on the market in a comparatively short time. While it is not possible at this writing to give definite dates, the plans are progressing very rapidly, when considering the difficulties of securing necessary machinery and raw materials, and it is certain that the United States will shortly be independent in all respects in the dye industry, and even in position to cultivate the markets of the world.

A Farmer's Convertible Automobile.

A Maryland farmer uses a simple scheme for doubling the usefulness of his light two—passenger (roadster) automobile. It consists of a pair of auxiliary rear wheels, and a quickly detachable freight compartment, which is made interchangeable with the regular hinged-lid compartment provided on the car. The wheels were fitted up by a blacksmith. He made over two ordinary wheels by riveting a six-inch wide steel band around the tire rims. The band is studded with rivets, or projections, to secure traction. The diameter of these wheels is about six inches less than when fitted with tires and in consequence there is more pulling power, though at a somewhat reduced speed.

Equipped with the wide wheels and the freight carrier the car can travel readily on fields and roads that are impassable with the regular wheels. The farmer is enabled to bring in his crop from the fields to the storage houses or direct to the markets.

When the car is to be used for passenger carrying purposes only it is a simple matter to remove the body and wheels, and put on

the regular wheels and the original hinged-lid compartment.

Chemistry by Wholesale.

The United States Government has completed the world's greatest plant for manufacturing smokeless powder. The plant is composed of nine units, with an aggregate daily output of 900,000 pounds.

The "Old Hickory" plant, as this gigantic establishment has been christened, is what is known as a self-sustaining plant, combining all the features of the ordinary gun-cotton and smokeless powder factories. There are complete units for the manufacture of every ingredient that goes into either of these explosives, together with facilities for meeting some of the demands of other government powder plants. Each of the nine sections is practically complete within itself, isolated from the others for safety in the event of accident, and approximately eight times the size of the largest smokeless powder plant in this country prior to the war. The entire establishment is accordingly some seventy times the size of the largest factory of its kind we had in 1914.

It was, of course, necessary to build a town for the employees, and though some 12,000 of the workers will live in a nearby city (Nashville), and go back and forth each day, the population of the new community will be about 20,000. For those living in Nashville a special railroad has been constructed leading to the plant.

Some idea of the scale of operations may be had from the statement, that 5,000 tons of coal are consumed daily, together with a hundred million gallons of water—enough water for a city of a million inhabitants. Of this water, 65 per cent issued in the chemical processes for which it must be treated and filtered. The bare idea of 65,000,000 gallons of reactions per day is quite sufficient to make the laboratory chemist gasp, and should give him a clear understanding of why it is that the manufacturer cannot always do, on a factory scale, the things which the investigator can accomplish with comparative ease in a test tube.

In addition to the railroad, which is built iuto the plant, it has been found necessary to reconstruct the highways leading from Nashville; and within the plant itself many miles of standard and narrow guage track are being operated. The plant contains about 35 miles of the former and 46 miles of the latter track.

Textile Substitutes.

Extensive experiments are being carried on in the United States for the manufacture of bagging, packing material, cushion and mattress fillings, twine, rope, etc., from the straw fibre of barley, wheat or rice, according to the strength of the material wanted. The plant for working the straw is very simple and requires a steam boiler, receiving tanks of sheet iron and common wood, running water and sheds. The time required for transforming the straw into a fibre for weaving or spinning is stated to be about two hours. After passing through the water and steam process the product is dried and beaten simultaneously, then carded and lengthened. The machinery commonly used in the jute industry, with slight modification, is suitable for working the straw thread. To obtain a stronger thread the straw fibre may be mixed with jute in the proportions required—that is, for the coarsest grade 5 per cent of jute is used, and for the finest varieties up to 50 per cent. The product obtained by this mixture has been tested for its strength, and the resistance of the straw thread so worked has been declared by competent authorities to be comparable with that of jute. In view of the jute scarcity everywhere the lower cost of the new product, and the opportunity afforded of utilizing this straw, hitherto unused, the discovery bids fair to introduce a flourishing industry.

IMPROVISED WATER WHEELS.

Confronted by the possible loss of 4,000 acres of wheat in the State of California, due to lack of water, an ingenious engineer improvised four water-lifting wheels from odds and ends of machinery in the short space of twelve days and succeeded in saving the grain. In the engineer's favor was a canal running from a lake to the fields, which had been abandoned because of the excessive cost of pumping. Near by was a bariety of worn-out pieces of oli-pumping machinery.

Out of the familiar cable drums employed in connection with the oil derricks he constructed the water raising wheels, which were installed at as many points along the canal and set to running with tractors and other ranch machinery. The wheels were from fourteen to nineteen feet in diameter, and from four to five feet wide. They were driven by flexible chains instead of spur gears, thereby lessening the wear and tear on the equipment. In one case a centrifugal pump and a water wheel were operated side by side. The former delivered fifteen cubic feet per second as against eighty cubic feet per second delivered by the latter. Each was operated by a 45 h. p. engine. The marked difference in efficiency was accounted for, in part at least, by the loss of effectiveness which the pump sustained in accelerating the speed of the water. With the wheel, on the other hand, the loss was reduced to a minimum, inasmuch as the water was moved slowly. The largest of the wheels lifts 100 cubic feet of water per second, covering 400 acres of land with six inches of water in twenty-four hours. The engineer is now standardizing his makeshift water lifters and has greatly extended the region irrigated.

BEETS DUG BY NEW MACHINE.

An interesting and ingenious labour-saving machine has just been designed for harvesting beets. Mounted between two traction wheels is a novel third wheel having tines projecting radially through holes in the tire, the inner ends of the tines being attached to a belt inclosing a stationary cam. As the wheel and tines revolve, the cam causes the tine ends to be thrust beyond the tire just as they strike the ground, piercing the beets in their path.

At the lower end of the adjustable frame in which the digging member is mounted is a V-shaped share which loosens the dirt below and on either side of the beets as the harvester is drawn along, so that the sharp prongs pull the vegetables from the ground very easily. On being swung part way around the wheel the beets are handily discharged into a conveyor by the withdrawal of the tines.

CHECKING SPREAD OF MINE EXPLOSIONS.

The method of localizing explosions in mines by throwing rock dust into the air, blast that precedes a dust explosion as it moves along a mine gallery, has been greatly improved by the invention of an automatic rock-dust distributor. It is claimed that it is unsafe to rely on the initial rush of air to distribute the non-inflammable dust in advance. The new apparatus consists of a dust container having a discharge spout at its lower end, and with two outlets of a compressed air tube installed in the device for the purpose of blowing the dust out. A valve on the spout is electrically controlled. A thermostat, which forms part of the electric circuit, is placed some distance from the container, and when a blast takes place tbe heat actuates the thermostat, causing the apparatus to begin scattering the dust before the flames arrive.

ALFRED T. MARKS.

NOTES.

In another part of this issue we print Extracts from Sir Harcourt's address made at the recent Convocation of the Allahabad University. The speech is a most suggestive one and will repay perusal. We would draw particular passage which occurs in it:—"Our educational machinery is in part worn out and rusty, but still it has accomplished much. Faulty and make-shift as it necessarily has been, our education has made modern India. It has purified public services, it has increased the number of men who think it has prepared the way for new ideas and larger conceptions of civic duty. It has opened new avenues of employment; it will end, I trust, in growth and the spread of Imperial ideas. There are still great walls of ignorance to be battered down. There are many and great temples of education to be built up. There is a call for highest service from the best of India's sons but members have been stirred. Beginnings of desire for free and compulsory education are manifest, great hopes thrive and grow. In a short time we have fulfilled a long time. Even before the war new ideals of educational policy were in the air and war has changed the aspect of policy such as a stream of lava changes the country at the base of some great volcano, or a tidal wave changes some island in the Pacific Ocean. The war has broken up the despotism of *humanities and has installed a federation of* sciences and humanities. This is a great master change. For centnries education has, to use Macaulay's phrase, disclaimed to be useful. It must be useful now. And, yet one may hope humanizing of science. The scientific use of humanities will go on side by side. No mere materialistic education will ever satisfy India. Over and above us all towers the peak of sheer educational power, over us all is still cast the spell of ideal."

The Irrigation Administration Report of the United Provinces for the year ending 31st March, 1918, says that the area irrigated by all canals was 3,209,425 acres, which is 297,334 acres more than that irrigated in the previous year, and 68,309 acres in excess of the average area irrigated during the three years ending 1916-17. There was an increase in the area of all crops irrigated except in the case of the inferior food grains. The sugar-cane area of 365,605 acres is the highest record, the increase being 5,639 acres over the next highest on record in 1912-13. The area under wheat was 934,760 acres or an increase of 75,252 acres compared with the area irrigated in the last year. The area is however 53,404 acres less than that irrigated in 1905-06; and 123,871 acres less than the record area irrigated in 1899-1900. The indigo area irrigated was 156,543 acres which is an increase of 30,719 acres over the area irrigated in 1916-17, and an increase of 140,093 acres as compared with the average area irrigated in the ten years ending 1915-16.

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The following Statement prepared in the Department of Statistics, India, shows the quantity and value of Cardamoms imported from foreign countries by sea into British India during November 1918:—

Articles and countries of consignment.	November 1918.	
	Quantity	Value
Spices—		
Cardamoms—	lbs.	Rs.
Ceylon	3,891	2,555
Hongkong	910	731
Total ...	4,801	3,286

The following Statement furnished by the Department of Statistics, India, shows the quantity and value of Milk, condenced and preserved, including milk cream, imported by sea into the different maritime provinces of British India during November, 1918:—

Share of provinces.	Quantity	Value
	lbs.	Rs.
Into Bengal	144,705	88,395
,, Bombay	831	418
,, Sind	18	28
,, Madras	23,104	14,662
,, Burma	188,899	95,457
Total ...	357,557	1,98,960

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According to the *Board of Trade Journal,* a Permanent Bureau for Standardisation in the Netherlands is to be established. It is recognised that one of the means for enabling various branches of industry to compete after the war will consist in the standardisation of constructional parts, with a view to the more economical manufacture of such parts in bulk.

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Mr. A. Barnett-Saunders, who was one of the prisoners at Ruhleben from the beginning of the war, compiled while there a large number of extracts from German publications dealing with the provision of Ersätz or substitutes for all manner of things. The manufacture of these articles went to great lengths. One of the German comic papers made a Berliner ask 'Why was Meier fined so heavily'? His friend replied, 'Because he adulterated the imitation of a substitute for a substitute for jam.' Familiar by now is *Kaffee-Ersatz,* made out of acorns and horse chestnuts, but there were also 'acorn coffee,' 'lupins as coffee substitute,' 'carrots as coffee substitute,' and a coffee substitute from beet-root. When the ersatz could no longer be produced 'an ersatz for the ersatz' sprang into existence. There was 'artificial honey' and then 'artificial honey substitute.' Washers for taps gave out: the ersatz failed and there appeared a 'substitute washer substitute.' Among the substitutes Wermuth-Wein Ersatz figured, containing 98 per cent water and only 2 per cent of colouring and tasting matters. A caricature of these substitutes showed two rabbits, and bore the inscription, 'We are now substitutes for pigs, and must learn to grunt.' Often the motive prompting the issue of these ersatz was bare-faced commercial exploitation of the German masses.

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The following is from the Bengal Government Order reviewing the Report of the Bengal Agricultural Department:—The continued rise in the prices for home reeled silk is reported to have resulted in a considerable increase in the area under mulberry in Bengal. The effects of improved prices are also show in the financial results of the supply of seed-cocoons from the Government nurseries, the receipts for the nine months under review being Rs. 32,563 compared with Rs. 16,829 and Rs. 28,737 in the full years 1915-16 and 1916-17. Nevertheless Babu A. C. Ghosh, the Superintendent of Sericulture reports that the silk industry is rapidly disappearing in Bogra District on account of the high wages of labour and the superior attraction of Jute. Sericultural work has continued on the same lines as in previous years. The new features of the work were the introduction of the more accurate method of detecting pebrine in moths advocated by the Imperial Agricultural Bacteriologist, and the setting apart of the Sericultural Nursery at Berhampore for testing on a practical scale the races of silkworms which have been reared by Mr. P. C. Chadhuri, who is carrying on M. Grangeon's work, and by Miss Cleghorn. The results of these trials will be awaited with great

interest. The Governor in council has not yet received the opinion of the Provincial Silk Committee on the recommendations of Mr. Lefroy, late Imperial Silk Expert.

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A Press Communique, dated Delhi, the 29th January 1919, says:—A telegram received by the Government of India from the Right Honourable the Secretary of State for India announces that the export from the United Kingdom of the following articles is now permitted without license:—Manganese and manganese ore; Manganese peroxide and ferro-manganese; Tungsten ores; Flax and linen goods; Hemp of all kinds; Sandal-wood for medicinal purposes; Sandal-wood oil; and Mahogany and hardwoods. A general import license, valid till 1st July, has been issued for the import into the United Kingdom of:—Cassia lignea; Hides, wet and dry; and Pimento. It is also stated that the existing general license for the import of the following articles will be continued until the 1st July 1919:—Bladders, Casing and Sausage skins; Coffee; Horns and hoofs; and Tobacco (manufactured and unmanufactured) including cigars and cigarettes.

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A Press Communique Delhi, January 30, 1919, states:—The conditions created by the war have emphasised the great importance of an investigation of the fibre resources of the Empire, and India with its present monopoly of jute cultivation and its wide variety of climatic conditions offers a promising field for investigation. The necessity for increasing the cultivation of flax, for instance, has already been recognised, but enquiries have shown that further experiments are necessary before a considerable increase in the cultivation of this crop can be effected, and detailed investigations are required to ascertain how the production of other useful fibres can be increased. Since 1907, the labours of Mr. R. S. Finlow, fibre expert with the Government of Bengal, have been mainly concentrated on jute, and his activities have been geographically limited to the provinces of Bengal and Assam, with occasional visits to provinces where jute experiments are in progress in order to observe results and to offer advice. It has now been decided to extend the scope of Mr. Finlow's work with a view to the thorough exploitation of the fibre possibilities of India. Mr. Finlow's investigations will extend throughout India. His duties under the scheme will be purely advisory and his head-quarters will remain at Dacca in order that his important work in connection with Bengal jute may not be interrupted. Experimental work will be carried on through the local Agricultural Departments, and manufacturing tests will be conducted at the Agricultural Research Institute at Pusa in collaboration with the Imperial Agriculturist. The scheme as outlined above will take effect from the 1st February, and will be continued for the present for a period not exceeding two years.

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The fourth meeting of the Industries Section of the Board of Industries was held at Allahabad on 23rd January 1919. Amongst the items dealt with was the question of granting loans to passed students of the Central Weaving Institute, Banares, to enable them to purchase looms and accessories to carry on their occupation as weavers after finishing their school course. The scheme had the approval of the Board and was recommeuded to Government.

SPEECHES AND PRONOUNCEMENTS.

BENARES HINDU UNIVERSITY.

H. H. The Maharaja's Speech.

The following is the text of the speech delivered by H. H. the Maharaja of Mysore at the recent University Convocation at Benares :—

Your Highness the Pro-Chancellor, Mr. Vice-Chancellor, Ladies and Gentlemen,—I esteem it a high privilege to preside at the first Convocation of this University in the presence of such a distinguished gathering. Although the distance of Benares from my own territories does not permit my visiting the University as often as I could wish, or associating myself very closely with its affairs, yet, believe me, I shall always take the deepest interest in its welfare and shall recall with gratification the great honour which the University authorities have paid to me in selecting me as their first Chancellor.

The history of the Benares University illustrates the unwearying courage of the leaders of the movement; their capacity for sustained effort, their co-operation and their powers of organization. To-day we may recall with pride and gratitude the pioneer work of the illustrious promoters of the Hindu University movement—His Highness the Maharaja of Benares, the Maharaja of Darbhanga, the Hon'ble Pandit Madan Mohan Malaviya, who has dedicated his fine talents to the service of this institution and to whose devotion and untiring labours the scheme mainly owes its inauguration, Mrs. Besant, who placed at our disposal a fully organized College which enabled us to make an early start, their Highnesses the Maharajas of Gwalior, Kashmir and Bikanir, and others whose services will ever live in the memory of our people.

Of the many important measures which distinguish the viceroyalty of Lord Hardinge, not the least in its beneficent and far-reaching effects is the Benares Hindu University Act of 1915, by which the Government of India, under his inspiration and guidance, set the seal of its approval upon one of the greatest popular educational movements of the times. Lord Hardinge thus earned the eternal gratitude of the Hindus by generously permitting the establishment of an institution upon which the entire community had set its heart, and I have no doubt that the foundation of the University was well and truly laid by the hands of one who sympathised so deeply with Indian needs and aspirations. Nor should I omit, on this occasion, to acknowledge, with gratitude the conspicuous services rendered to our cause by Sir Harcourt Butler, who was Educational Member of the Government of India at the time when the Act was passed, and who still maintains a keen interest in the affairs of the University. I grieve to think that this young University has suffered, so early in its career, two serious bereavements—one by the death of Sir Sundar Lal, its first Vice-Chancellor to whose untiring exertions it owes much of its initial success, and, the second, by the death of His Highness the Maharaja of Jodhpur, whose princely munificence enabled it to proceed with the organization of the important department of Technology. There is not one of us here who does not feel that this occasion has been saddened by the absence from our midst of these two notable benefactors.

After many vicissitudes and many years of toil, we are assembled here to-day to gather the first fruits of our labours, and this important event in the history of our University comes happily at a time when the most terrible war that the world has ever seen, is at an end. We rejoice on such an occasion to congratulate His Majesty the King-Emperor and the British Nation on the decisive victory of the British Empire and its Allies. The war has demonstrated the greatness of the British character, no less than the deep rooted loyalty of the Princes and people of India to the British connection. May we hope that the outlook of the human race is changing, and that a new era is dawning on a world saddened by the tears and sacrifices of many nations—an era of the reign of right as opposed to might, of principle as opposed to expediency, and of peace as opposed to aggression.

Though, as the recent war has shown us, it does not necessarily follow that every increase of knowledge is accompanied by a betterment of conduct, still, the doctrine that knowledge is virtue, is one to which our Vedanta gives support when it attributes sin and downfall to "Avidya" or ignorance and sees in "Vidya" or enlightenment, the

liberation and perfection of the soul. Therefore, centres of culture like this University have a noble purpose to serve, and can contribute materially to the enlargement of human ideals and to the promotion of inter-racial and international fellowship. But they can achieve this end only if their outlook is as wide as humanity itself.

This University is the most striking manifestation of India's effort at self-determination and self-expression. It is, or it ought to be, the embodiment of the very soul of Hindu India, her noble tradition, elevating impulses and devotional culture. It is the first private University in the country as contrasted with Government foundations, and it has, for that reason, possibilities of freedom and self-development peculiarly its own. Along with the project for the Aligarh University, which I sincerely trust will soon be an accomplished fact, it has done much to quicken the confidence of Indians in their capacity to take independent charge of education in all its grades and is entitled, in no small degree, to the credit of having ushered in a new epoch in the history of higher education in India—an epoch marked by the foundation of compact unitary Universities of the teaching and residential type, organized and administered by Indians and adjusted, in varying degrees of completeness, to the special conditions, requirements and aspirations of Indians.

In all our future efforts, however, we should always bear in mind the noble ideal which was set forth in the Address presented to Lord Hardinge on the occasion of the ceremony of laying the foundation stone of the Hindu University, that, in order to preserve and promote our distinctive civilisation and culture, and to instruct our youth in the sacred precepts of religion, it was necessary to build up an ideal University which would seek to combine the practical efficiency of the modern system of education with the high spiritual ideals of ancient India. Especially should we Hindus, with our glorious past, beware of the temptation to confuse patriotism with blind adoration of ancient days, coupled with a feeling of repugnance for everything modern and foreign. No nation is impoverished by commerce with other nations; no civilisation can suffer by intercourse with other civilisations and by an intelligent assimilation of the principles, ideas and practices that have proved to be beneficial to other peoples and countries. I trust, therefore, that the Benares University will gather the fruit of all ages and countries, will keep abreast of modern progress and will bring up her children to become healthy and strong and well-fitted to remould the destinies of India on sane, yet progressive, lines.

The very location of this University, in the ancient sacred capital of Hindu India, which has maintained unshaken its spiritual sway through all changes of history, constitutes an inspiration, both remarkable and unique. There is a magic and enchantment about the very name Benares which thrills the heart and fires the imagination, setting in motion a long train of ennobling, patriotic and spiritual memories. Such sentiments should not, however, be developed to the prejudice of a liberal culture which sets its face against sectarian strife and jealousy while keeping its individuality. The Benares University should develop such a culture in its widest sense as the embodiment of a New and United India, and should aim at a definite preparation for citizenship, in the largest sense of the term, as one of the principal objects to be pursued. This will include moral education or training of character. I understand that, in America, where the problem of fusing a variety of peoples into a common nationality is as urgent, though perhaps not so difficult, as in India, education in citizenship, patriotism and loyalty to the constitution have been included amongst the objectives of the school system. The cultivation of the ethics of citizenship and patriotism is specially needed in India, where clan, tribe and caste have had a deplorable tendency to produce communal exclusiveness and differences. I trust that the compulsory education in Hindu religion and morals, which is a feature of this University, will result in the promotion of a liberal culture of the type contemplated above.

Besides, we have to bear another factor in mind. The modern age is characterised by the knowledge and cultivation of the physical sciences and by their increasing application to the methods of economic life. Scientific knowledge and economic progress go hand in hand, and form the very foundations of national life, and, unless we achieve both, we are bound to fall behind in the march of progress. This University should, therefore, address itself to the development of its modern side by organizing such practical faculties as those of Technology, Applied Chemistry, Agriculture and Commerce, so that trained talent may be available in the country for the development of its vast and varied material resources. Let the University turn out a new type of learned men, who will be fit to be the captains of our Commerce and Industry, leading the country along the paths of a sound economic advance and winning for her a leading place in the international industrial struggle.

There are some people who think that India is becoming over-educated, and who point to the large number of students seeking admission into the

different Universities and to the glut that there is in the market for their services as reasons for their belief, but compared with foreign countries, the number of people who have any education in India is deplorably small, those possessing higher education is smaller still, and there seems to me to be no justification for regretting an increase in the number of our graduates. But all the same, there must be some good reason somewhere for the distrust and suspicion with which the overflowing of schools and colleges is looked upon by some friendly critics. I venture to suggest that the real trouble is not over-education but mis-education, by which I mean the giving of the wrong kind of education. Doubtless, in early days, the necessities of Government Service had a predominant influence in determining the extent and character of the education given in India, and the evil complained of, *viz.*, mis-education, is due to the insistence on a type of education which is no longer suited to our conditions, which has been outgrown in most other countries and which requires to be altered in accordance with the larger conceptions of education now prevailing. One of the inevitable results of this policy is the fetish which is still made of Government Service, which is the "be all" and "end all" of a majority of the graduates who leave our Universities. It looks a simple truism to say that popular education cannot in all points be similar to education intended for a limited purpose, or for a limited class, but it is the neglect of this truism that must be held to be responsible for one unsatisfactory aspect of education in India. The more popular a system of education is, the more thorough should be its impregnation with the industrial spirit, which will also have the further effect of giving the precept regarding the dignity of labour more reality, than it has possessed so far in India.

It is gratifying to find that the Benares University has already recongnised the importance of Technology, and has made preparations for the formation of a Faculty in this subject. In this connection, we may gratefully acknowledge the princely donation which has been given by His Highness the Maharaja of Patiala in aid of the Department of Technology. I trust that the steps taken to establish the Faculties of Agriculture and of Technology will soon lead to tangible results. This country will, I am sure, realise that to equip and conduct a Technological Faculty on up-to-date lines, keeping pace with the improvements in the mechanical arts and sciences that are effected almost day by day, will cost a great deal of money, and that it will not be possible to carry on operations successfully unless the funds at the disposal of the University for this purpose are vastly increased.

I would like to say a few words to the new graduates, and specially those who are about to leave the University. I would impress on you, in the first place, the importance of discipline in schools and colleges and of self-disciplining in after-life. There is no walk in life in which the observance of discipline is not essential to success. No army can fight without it, no athletic team can succeed in which discipline is not observed, no Government administration or business firm can "carry on" unless those members of it, whose duty it is to obey, submit themselves loyally to their leaders and so learn in time to command others.

Finally, I would impress on you that you should endeavour to combine in your lives a real sense of religion with true culture; to believe that you owe a duty to God and to your fellow-men, and to aim at faith without fanaticism, difference without weakness, politeness without insincerity, and, above all, integrity of character in thought, word and deed. The ideal is a high one, but you can at least try to live up to it. But even this is not enough. The country needs something more virile than the accomplished gentleman. It needs men of enthusiasm, even more than refined intellectuals pursuing the easy path of wordly wisdom, wordly compromise and wordly success. It needs men of stout *hearts* and strong hands, who will not allow their conscience to be drugged by sophistry of any kind, or their nerve to be paralysed by the fear of unpopularity, but will oppose wrong whenever found, and fight unflinchingly the bottle of social justice and emancipation, on behalf of the week and down-trodden. Like the Gurukula at Haridwar, every Indian University should aim at sending forth men filled with intense patriotism for service, and with zeal burning in their hearts. Indian Universities will be judged by two standards, firstly, by their contribution to discovery, invention and the expansion of the field of science and art; and secondly, by the number and the quality of the men whom they send forth, filled with a genuine devotion to the good of India and to the service of their fellow-countrymen of all grades and ranks, irrespective of caste and creed. I have every confidence that the Benares University, itself the child of patriotic labour and sacrifice and the inheritor of the highest traditions of a spiritual people will be able to satisfy both these tests, and will take a foremost place amongst the influences that make for light and leading in our ancient and beloved Motherland.

It is my earnest hope—a hope which I know will be echoed by millions of my countrymen—that the Benares University may not only be an object of special veneration and solicitude to the Hindus, but may also attract, by the quality of its secular education, young men of all religious persuasions in India. The institution should be Indian first and Hindu afterwards. The graduates who receive their degrees to-day are a handful, but their number is destined to grow. I look forward to the day when young men from all parts of India will fill these lecture halls and, after completing their education, will go out skilled and capable, and equipped both mentally, morally, and physically to fight life's battles as citizens of this great country. If wisely guided, the University should, in due course, become a truly national institution of which every Indian, whatever his race or creed, might be justly proud.

INDUSTRIAL CONFERENCE.

MR. PETIT'S PRESIDENTIAL ADDRESS.

Criticism of Industrial Commission's Report.

The following is the presidential address of Mr. Jehangir Bomanjee Petit, delivered at the fourteenth session of the Indian Industrial Conference held at Delhi on 30th December, 1918:—

Mr. Chairman of the reception committee, brother delegates, ladies and gentlemen,—

I thank you very sincerely for the great honour you have done me by inviting me to preside over your deliberations.

In spite of the fact that the notice given to me was exceedingly short, which circumstance unfortunately in my case, was rendered more difficult by the consciousness of my own limitations, I have considered it an honour to respond to the call of duty—though not without diffidence, I admit—in the confident hope that I shall have your valued co-operation and consistent indulgence in the adequate discharge of the responsibilities devolving upon the president of an important all-India organization of this character.

Although I come of a family of merchants and industrialists, and am one myself both by inclination and persuasion, and am therefore in a position to accurately measure and appreciate the important part played in the progress and regeneration of a country by its commerce and industries, I emphatically declare that I am not one of those who think that the industrial development of a country is more important than and must have precedence over, its political emancipation. I hold that a country, in order to be industrially great, must first be politically free. It must breathe the air and exist first before it can embellish its life. It was more than 33 years ago that our great national movement with its political programme in the forefront, was inaugurated by, and under the guidance and leadership of the first-guard, which unfortunately is now gradually disappearing. Since then the country has readily and very properly accorded it the place of honour and always regarded it as the first child of our national movement. Even in these days of aggressive and scientific industrialism and in spite of our enthusiasm for the creation of an industrial India, I am certain that the country as a whole would not be prepared to deprive the first-born of its rights and privileges of primogeniture.

The Indian Industrial Conference was started in the year 1905 as an adjunct to the Indian National Congress, and has with her elder sister made the modern history of India. The movement has done very valuable work in the past; but if it is to keep pace with the exacting requirements of modern times and fulfil all that is still expected of it—and it is much—it must be properly recast; its constitution entirely reshaped, and its administrative and executive machinery, adequately equipped. In fine, it should be made into a living and active organization, with plenty of creative and propelling force behind it. I notice in the report of the proceedings of the last year that a representative committee was then appointed to determine *the future lines of the work of the Conference;* and I do sincerely hope that the report of this committee will be such as will justify the high hopes placed in the Conference for the future.

The fourteenth session of the Conference, which we are holding to-day, is rendered memorable owing to the occurrence during the year under review of at least three events of stupendous importance to the industrial future of the country. These are (*a*) the Montagu-Chelmsford Reform Proposals; (*b*) the Report of the Industrial Commission; and (c) the termination of the world-war. The first promises liberty and holds out hopes to the Indian people to develop in their own way by bringing about a steady reform in existing conditions. The second indicates the line of development so far as the industrial side of the question is concerned. The third offers numerous opportunities for development, in consequence of the subdued and sympathetic atmosphere created by a fortunate combination of forces, non-existent and even unthinkable in pre-war days.

As this Conference is directly concerned with the effects of the report of the Industrial Commission,

I offer no apology for selecting that out of the list I have mentioned for dissection and careful examination. In view also of the fact that the said report covers the entire range of commercial and industrial subjects which can be, and in the ordinary course of events, would have been dealt with by the Conference, I am sure you will understand why I propose to confine the rest of my address to this important and all-absorbing topic.

INDUSTRIAL COMMISSION'S REPORT.

Broadly speaking, the report indicates a welcome change in the hitherto apathetic attitude of the Government towards the industrial needs of the country and 'the definite adoption of a policy of state participation in Industrial development.' It is a sad commentary on the statesmanship of the Government of this country that an unprecedented world war with all its horrors was necessary to open its eyes to the utterly helpless condition of economic and industrial dependence to which by its conservative, self-centred and I am sorry to add, in many respects, unrighteous system of administration, India has unfortunately been reduced.

The report of the Commission covers so wide a range of questions and is so comprehensive in its scope that I am sure you will readily admit that it would be difficult to deal with it exhaustively in the short time at my disposal. I shall, however, endeavour to speak of the principal features thereof as briefly as possible; and venture to offer constructive suggestions for such action as may happen to appear to be the most urgent need of the hour.

After exhaustively dealing with the various factors that have operated against the successful industrial growth of the country, the report comes to the perfectly correct and inevitable conclusion that '*a powerful and well-directed stimulus is needed to start the economic development of India along the path of progress*;' and adds that '*such a stimulus can only be supplied by an organized system of technical, financial and administrative assistance*. In brief, the principal constructive proposals made in the report, in the language of the report itself, are the introduction of a system of technical education in practical relation to industrial requirements, the supply of advice and assistance through organized scientific and technical services and the provision of more liberal finance for industries, so far as possible through private agency.' The administrative machinery proposed by the commission to put these recommendations into effect, consists, mainly of the creation (*a*) of Imperial and provincial departments of industries; and (*b*) of two new services, *viz*., the imperial industrial and the imperial chemical.

The recommendations also include the provision of (*c*) provincial industrial and technical schools; (*d*) technological provincial institutes; (*e*) institutes for the training of mechanical engineers; and (*f*) workshops and laboratories attached to the the Imperial and Provincial Directors' Offices.

Also the following schemes as possible ones :—

(1) A Central Engineering College;

(2) A Metallurgical Institute at Sakchi; and

(3) A Central Chemical Institute.

(*a*) Personally, I have always held that the lack of an industrial executive is inimical to industrial progress; and I therefore all the more readily welcome the proposal of the creation of Imperial and provincial departments of Industries, made in the report, as the first step towards the realization of the two main principles now definitely accepted by the Government and unequivocally referred to in the report as follows :—

(1) 'That in future Government must play an active part in the Industrial development of the country, with the aim of making India more self-contained in respect of men and material; and

(2) that it is impossible for Government to undertake that part unless provided with adequate administrative equipment and forearmed with reliable scientific and technical advice.'

The idea of centralising the imperial department under a separate member with a seat in the executive council, to co-ordinate and direct the general industrial policy of the country, is in my opinion, a very good one. There is no doubt a sufficient number of closely allied functions to justify the creation of a specialised imperial department in their performance. I am equally certain that if properly manned and conducted in the right spirit, a separate Imperial department for industries will before very long be able to achieve, with regard to the numerous far reaching questions that are sure to arise regarding industrial development, what neither the present revenue and agricultural departments nor even the present department of commerce, can or has been able to do.

I cannot help saying, however, that I agree with my friend and our distinguished countryman, the hon. Pandit Madan Mohan Malavia, in thinking that instead of the proposed Imperial Executive Board of Industries, an advisory board similar to that proposed for the provinces should be constituted, consisting largely of elected members, for reasons set forth by Pandit Madan Mohan in his very able minute, with most of which I am in substantial agreement.

(*b*) So far as the two services proposed and the other appointments contemplated in the report are

concerned, I am of opinion that they should be reserved exclusively for Indians. Taking into account the country's previous unpleasant experience in connection with appointments to lucrative posts, and having special regard to the fact admitted in the report that 'there will be similar post-war demands made at home and in the dominions for scientific, especially chemical, experts which will render it difficult to obtain suitable recruits from England,' I venture to think that the step that I propose, is not altogether without force. I am open to admit, however, that there may be occasions on which the requisite talent may not for the moment be available in the country; and I am prepared to grant that under such exceptional circumstances—but only under those—really capable and highly specialised experts may be brought out from abroad on the distinct understanding that their appointments should be for short periods only, and with the additional proviso that they should train our own men in the technique of their work. In this connection a passage quoted by Pandit Madan Mohan in his minute of dissent from the written evidence of Mr. Gibbs, the general manager of the Tata Hydro-Electric and Power Supply Co. Ltd., is of special interest. Says Mr. Gibbs:—

'No man should be imported into India unless he is a recognized expert in his particular line. He too should be engaged on short-time contract and made to understand he is being engaged and paid to teach our local men just as much as to introduce and to carry on his work. The young man from abroad who is educated but inexperienced, should not be brought to India and allowed to get this practice here.'

How raw and sometimes even worthless young men are often brought out to this country as experts and specialists, without the remotest title to these appellations to the unjust and continued exclusion of indigenous talent even of a very high order, is a fact too well-known to be dilated upon at this time of the day. As a glaring instance of this pernicious system, I may refer to the fact that in the recently established Munitions Board, out of 250 officers only three are Indians and even these have been appointed only to the posts of assistant controllers.

THE TWO PROPOSED SERVICES.

Ig regret to say that I am unable to agree with my friend the hon. Pandit Madan Mohan Malaviya that the creation of the two proposed services should be delayed for the present; although I think with him that simultaneously, such materials, labour and capital as are available in the country, should be utilised as the best purpose by all means in the power of the Government with the help of imported machinery and technical expert knowledge. It must be remembered that there is hardly an Industry of any importance that does not already exist in the country in one form or another. The question is only that of the application of technical and scientific skill and of financial stability. In my opinion, the services recommended in the report, are likely to prove of immense value to the country immediately they are created. We must not forget that it is as important to introduce new industries as it is to improve and perfect old ones. I recognize the value of making an immediate beginning by liberally drawing for the moment upon foreign countries for machinery and other technical appliances, as also for real experts as first managers and other technical workers, and getting our own men gradually trained up under them. It was by means of such a system that the Indian Textile Industry has been built up and it is again by a similar method that Sakchi—the place where the great Tata Iron and Steel Works are established—is gradually developing into the Pitsburg of the East. I have absolutely no objection to our beginning our Industrial efforts in this way; but what I do object to is that we should remain satisfied with such improvised methods. The proposed services, if properly manned, efficiently worked, and directed by the future reformed, and I hope Indianized Councils, will, in my opinion, give an impetus to the industrial movement in a decade which the other system, however good for a beginning, will not give in a century.

I cannot too strongly condemn the unwarranted view often expressed by ignorant and irresponsible people and which Pandit Madan Mohan tells us, was even urged by many European witnesses before the Commission 'that India is, and must, remain mainly an agricultural country, that the people of India are in the nature and tradition deficient in industrial capacity and commercial enterprise, and that these qualities are inherent in the nations of the west.' Inferrentially, we are asked to conclude that it would be extremely difficult if not impossible to produce not only practical industrialists in this country, but also such experts as may be needed for manning the various departments and services I have already referred to. In his admirable minute of dissent, Pandit Madan Mohan Malaviya has with brutal frankness and with a formidable array of unimpeachable facts and figures, mercilessly exposed this absurd and now exploded theory, and conclusively shown how India was at the height of industrial efficiency and was the supplier of many of the costliest necessities and most coveted luxuries of the world, when Europe, even including England, was in a comparatively backward condition. In the

report itself, we are told how at a time when the west of Europe, the birth place of modern industrial system, was inhabited by uncivilized tribes, India was famous for the wealth of her rulers and for the high artistic skill of her craftsmen.' Pandit Madan Mohan in his minute, by numerous quotations from great and eminent authors shows how 'the skill of the Indians in the production of delicate woven fabrics, in the mixing of colours, the working of metals and precious stones, the preparation of essences and in all manner of technical arts from early times enjoyed a world wide celebrity'; how Babylon traded with India as far back as 3,000 B. C.; how 'mummies in Egyptian tombs dating from 2000 B. C. have been found wrapped in muslin of the finest quality': how the large and growing consumption in Rome of the finished products of the art of India, costing enormous sums of money, aroused the Indignation of the elder Pliny; how 'the Hindus knew the art of smelting iron, of welding it and of making steel'; how cannons of the largest calibre were once manufactured in Assam; how 'Indian "Wootz" or steel, furnished the materials out of which Damascus blades with a world-wide reputation were made'; how Indian steel was in considerable demand for cutlery even in England; how the arts of spinning and weaving for ages successfully flourished in the country and afforded employment to a numerous and industrial population; in brief, in the eloquent words of the historian Murray, how 'its fabrics, the most beautiful that human art has anywhere produced, were sought by merchants at the expense of the greatest toils and dangers.' I refuse to believe that the inheritors and successors of a civilization at once so industrially advanced and so great, cannot produce the requisitive material for manning and conducting the different services created under the report; and even for ultimately developing a strong and stable structure of industrial and commercial enterprise leading up to the establishment 'of industries where the capital, control and management should be in the hands of Indians.' As in every other sphere of life, so in the industrial world, I hold that, given the same conditions, the Indian is as intelligent, as capable, as efficient, as artistic, as constructive, as imaginative, as creative, as laborious, and as honest a human factor, as any existing in the world.

On some matters of vital importance on which the public was entitled to expect the report to lay down definite lines of action, the Commission have unfortunately shirked responsibility and recommended the appointment of expert committees to work out the necessary details. A number of committees have accordingly been suggested and Government have been asked to rely on their reports when ready. Among others, even such important questions as the establishment of industrial banks, and of a research institute, have been entrusted to committees.

Notwithstanding this, many useful suggestions and indications have been made under various heads, such as the establishment of 'key industries' as a national necessity; the development of sugar, silk, and salt-petre industries; the provision of technological investigations encouraging the production of hide and leather; the provision of direct financial aid by Government to industrial enterprises in the form of guarantees on dividends, loans of money, undertakings to purchase output, or contributions to share capitals; the encouragement by Government of cottage industries and of co-operation in such industries; technical assistance to industries by Government including pioneering and demonstration works; the establishment of scientific and technical societies on the lines of similar institutions in England; the development of commercial education; a more thorough compilation and publication of commercial and industrial intelligence; the prevention of the adulteration of foodstuffs and drugs; the simplification of mining leases and the publication of mining manuals; the strengthening of the Geological Department, and the improvement of existing water-ways.

The idea of having an Imperial Department of Stores under a controller-general in India, made in the report, has, much to commend it, as during the duration of the war, India has shown her capacity to supply many of the most important requirements of Government departments. The report also takes a good survey of the available raw materials and of the possibility of developing forest resources, minerals and fisheries. The importance of scientific agriculture is also recognized and its introduction advocated. The sources of power, which exist in India, appear also to have been carefully considered, and important suggestions for their commercial utilisation, and particularly hydro-electric power, are made in the report.

The recognition of the urgent necessity of providing primary education for the artisan and labouring classes; and the recommendation for the introduction of a system of compulsory education for all classes of children, also form the welcome features of the report.

The report also recommends the appointment of a committee to consider the establishment of a school of navigation and Marine engineering. I would at the same time insist upon Government giving assistance to ship-building; and hope that the coasting trade of India will only be allowed to British bottoms.

MANAGEMENT OF RAILWAYS.

The total absence in the report of definite recommendations on the subject of the management of railways is disappointing in the extreme. The failure on the part of the Commission to deal with this question as also to deal effectively with the rates question, is inexplicable, as these matters were always understood to be within the purview of their work. A representative committee should now be appointed with as little delay as possible to examine the whole question. I am emphatically of opinion that all our railways in order to be thoroughly nationalised, should be entirely managed by the State. In the wise words of Mr. Churchill which Reuter transmitted to us over the wires the other day, ' the railways must henceforth be run in the general interest of the public as a whole and not in that of a class.' It will be readily conceded, I hope, that if nationalised railways are necessary for the industrial and agricultural development of an advanced country like England, they are all the more so for an industrially backward country like India. It is said that a special officer has been appointed by the Railway Board to go into the whole question of rates; and that he has already written a volume containing his recommendations. If this is correct, it is due to the public that his report should be published at an early date. Meanwhile, I welcome the principles enunciated by the Commission in paras 272 and 275 on the subject of the adjustment of railway ratings in the interest of indigenous industries.

I also welcome as steps in the right direction, the recommendations of the Commission about the appointment of a commercial member of the Railway Board and about the presence at the railway conference and at meetings of the goods classification committees, of representatives of British and Indian commercial bodies. At the same time, I am sure it will be readily admitted that the country should legitimately expect and is entitled to insist upon the introduction of a much larger element of Indians in the higher grades of the railway service. I am aware of the system of appointing Indians as probationers in state-railways; but it would be interesting to know why even there, no appointments were made this year.

Considerable thought has very properly been devoted by the Commission to the question of technical and scientific education; industrial experiment; and to research. The overlapping and misdirecting of energy in the existing arrangements have been recognized and exposed; and valuable suggestions are made regarding their improvements. In view of the very valuable recommendations made in the Report for the immediate establishment of provincial technological institutes, as also for the ultimate establishment of a central chemical institute, I am unable to agree with my friend Pandit Madan Mohan Malaviya in pressing for the immediate establishment of a central polytechnique institute in place of those recommended by the Commission, particularly because as recommended by Pandit Madan Mohan himself, the report of the Commission simultaneously recommends the utilization of existing facilities by the immediate development of the teaching of science and technology in our existing universities, and numerous collegiate institutes, and also because of a much larger and a more liberal annual provision recommended for scholarships for studies in foreign countries. In this connection, I would insist that the Indian Government when buying from English manufactories, such of their stores and other requirements as cannot be made in this country, must make it an absolute condition precedent to the orders, that Indians in certain numbers should be annually trained in their factories. Failing their acceptance of this condition, the Government should go past them and place the orders with foreign manufactories. I know that this suggession was put forward by several witnesses before the Commissioners, but it is unfortunate in the extreme that they have for reasons best known to themselves, thought fit to ignore it. I submit that the Indian Government exists only for this country and that it is its first and paramount duty to safeguard the interests of India and not those of the British manufacturers. It is a notorious fact that British manufacturers have studiously and more presistently, so of late, refused to admit and train Indians in their factories. It is said that Japan makes a similar condition when placing orders for British goods with British manufacturers and that these conditions are invariably accepted. If a foreign country like Japan can enforce this condition, it is incomprehensible to me why the Indian Government which is a part of the British Empire cannot, unless it is assumed that it does not wish to.

In this connection, I would also insist that the Railways and Public Works workshops should provide adequate facilities for the training of Indians as suggested in the report; and that they should also be admitted to their higher grades.

The introduction of the scheme of trade commissioners for India and assistant Indian trade commissioners is good, and, I welcome it. But I would device means at an early date by which the trade-commissionerships should be held by qualified Indians. I would, at the same time, also urge the extension of the scheme to all the important countries of the world; and would also incidentally refer

to extremely low salaries of £500 for Indian assistant trade commissioners, for which, at best, only second-class men would be available. The report also deals with numerous minor suggestions in addition to those I have already spoken of. Into the details of these, we need not go.

The concrete and definite proposals both imperial and provincial, made in the report, to which I have already briefly referred, will mean, if accepted, by the Government, an initial cost of Rs. 2,16,00,000 inclusive of the three possible institutions and a current annual expenditure of Rs. 1,23,00,000. How far the elaborate machinery devised, and the enormous capital and current expenditure recommended for it, will supply the real needs of the country, is enveloped in the mist of the future. But one thing is quite clear to my mind, that the success of this entire scheme must very largely depend upon the extent of the power that it is given to the representatives of the people in the Legislative Council to promote and control the industrial development of India.

I wish, however, that great attention had been paid by the Commission to the formulation of an adequate organization for propelling industrial enterprises in the country on a scale commensurate with the magnitude of the movement, the scheme for the educative machinery for which has been recommended, as we have already seen, at such a termendous outlay and with such great care and elaboration. Among the most important omissions, I would give the first place (*a*) to the question of the adumbration of a comprehensive system of financing the industries, such as industrial banks, which as we have seen, have been relegated to an expert committee and (*b*) to the question of tariffs.

POVERTY OF INDIA.

(*a*) It is a fact which cannot be denied that India is one of the poorest countries in the world and that her economic resources are of the scantiest character. The fabulous wealth of India which formed the topics of the historians of old, and attracted traders and plunderers alike to her unguarded and hospitable shores, is now, for all practical purposes, a thing of the past. Whether it be by her own folly or as the result of the heavy drain which necessarily accompanies a costly foreign Government, which unduly largely employs foreign agencies in every department of the Government and remits to England as much as the annual yield of the whole country from land, by way of home and other charges,—and that too from an almost entirely agricultural country like India; whether it be by some artificial or natural cause beyond the control of the Government and the people, or as the result of a policy of unequal and unenlightened distribution of the burdens of state; the stern fact remains and cannot be gainsaid that even to-day, after 150 years of British rule, India—in spite of her enormous wealth of raw products—is the poorest country in the world with only an annual average income of £. 2 per head: and that her resources for Industrial and other developments, are therefore necessarily almost nil. The need for supplementing them by all possible means open to the Government and the people, is consequently proportionately greater and more urgent than any other. It is equally true that a great many industries that could be started with success and for which the raw materials and other facilities are near at hand, could not be started in this coutry for want of the requisite funds. This is not only true in the case of such gigantic industries as the production of steel, sugar, colour, dyes and oils, but also in the case of a great many minor industries such as the manufacture of glass, candle, soap, matches, etc. It is now a matter of common knowledge that in a large majority of cases in which industrial enterprises have collapsed, the main cause of the failure, is want of capitial to begin with and in some cases, insufficient resources not only for current expenses but even for obtaining urgent expert advice and technical knowledge. That this should be so in a country which is not industrial to any very appreciable extent in the sense in which many of the great European countries are, and in which money under normal conditions ought not, therefore, to be difficult to find, is itself an important factor for very careful and serious consideration. The fact, however, is there, that it is so. Although I am prepared to admit that as a rule, capital in this country is shy, slow to move and unwilling to flow in untrodden paths, it cannot still be denied that it is difficult to raise money in India for industrial puposes, first, because the country is poor and there is not much capital in it; and secondly, because there are no efficient banking oganizations which can mobilize the financial forces of the country and make capital easily accessible. When the industrial development of a country is dependent upon capital, acquired largely through the gathering of small sums, special industrial banks like those in Japan and Germany or similar organizations, should be established with large capitals and numerous branches, designed to afford financial support to industries for longer periods and on less, restricted security than is within the power or practice of existing banks. Such banks or organizations, must, of course, require a large measure of Government support, although they need not necessarily be brought under rigid Government control. I am emphatically of opinion that Government should,

lend its whole-hearted support to such banks and place very large funds at their disposal, if possible, without interest; but in no case at a rate higher than 2 or 3 per cent. These banks should be included in the list of approved banks or financial concerns, in which trustees should be allowed to deposit Government funds. Remittances to these banks should be accepted by the district treasuries and the presidency banks; and they should be allowed to issue bonds for a limited period of not longer than ten years to the extent of at least double paid-up capitals. Fixed deposits for shorter periods than two years should not be received: and no current accounts should be opened in these banks, excepting for parties whom they finance.

GOLD STANDARD RESERVE.

I fail to see why the large reserves in India and those held in England on account of this country under various heads, cannot also be partly utilized for the industrial development of the country and placed at the disposal of such banks as I have described, if necessary, even under stringent Government control. There is the large gold standard reserve, amounting to over Rs. 50 crores. Then, there are the paper currency reserves which go considerably over this figure; and the large cash balances. We may assume that the last two may be required at any moment and cannot, therefore, safely be utilized for any other purpose. We may not even speak of the gold ordinarily held in India which had gone down from about £ 6 milion to about £ 100,000 on the 1st April, 1917, but no part of which is now held in India. But I cannot understand why a substantial portion, say about Rs. 10 or Rs. 15 crores out of the 50 crores of the gold standard reserve, cannot be utilized for industrial purposes. I have seen and heard various objections urged against this and similar proposals, but am sorry to have to say that I have not yet heard of a single really convincing argument advanced against this suggestion. First of all this gold standard reserve has no business to be in England. One of the recommendations of the Fowler Committee laid down that *the gold standard reserve should be held in gold and in India.* This has not been done; and instead, about £ 5 to 6 millions are usually lent out to private borrowers in England at short notice; and the balance is invariably invested in Exchequer Bonds, Exchange Bills, and British and Colonial Government Securities. There is no cogent reason way this should be so; and I am of opinion that a substantial portion of it can certainly be made available for industrial purposes in this country, with reasonable safeguards. During the last 20 years, I believe there was occasion to draw upon this fund in England *only once* and that too to a very small extent owing to the balance of trade going against India; and it is very unlikely that such occasions will come in the future with any degree of frequency.

FINANCIAL ASSISTANCE.

There are other methods both direct and indirect by which financial assistance *can be* given for industrial purposes and is being given in some countries of the world, such as, money grants-in-aid, bounties and subsidies, guaranteed dividends, supply of machinery and plant on the hire-purchase system, guaranteed or perferential Government purchase of products for limited periods and exemption from income tax, import duties and other cesses during the initial stages of newly-established and infant industries. Some of these are undoubtedly likely to be beneficial, and are even recommended in the report of the Commission; but, for various reasons I am against money grants-in-aid, bounties and subsidies, and guaranteed dividends except on very special grounds.

(b) There is some excuse, at least so far as the Commission is concerned, for the omission of the tariff-question, as it was deliberately removed from the scope of the enquiry. This step on the part of the Government has undoubtedly emasculated the enquiry, crippled the entire report and made it impossible for the commissioners to carry many of their recommendations to their natural and inevitable logical conclusions, as is evident from the dilemma in which they found themselves placed, as for instance, in the case of the leather industry—a circumstance which drew from them, the pathetic admission occurring at the beginning of para 54 at page 37 of the report, which runs as follows:—

'Here again, the exclusion of the question of tariffs from our terms of reference renders us unable to recommend any complete scheme for dealing with the situation.'

The resolution of Sir Ibrahim Rahimtoola of March 1916, asking for an inquiry into the industrial conditions of the country, made it quite clear that without fiscal freedom, the result would not be adequate. The hon. Sir William Clark accepted the resolution on behalf of Government but without the question of fiscal policy.

I cannot help saying that the Government in the past has not only neglected to develop the natural and other resources of the country but has also in a variety of ways, including huge protective tariff walls levied against Indian goods in England contrived to crush our nascent industries. The action of the East India Company with regard to Indian industries is sad reading and must form one of the blackest pages of British history. In recent years, the imposition of the excise duty on

the cloth made in India at the dictation of Lancashire and the more recent and artificial raising of the rate of exchange between England and India for wiping out the balance of trade in favour of India even as a special war measure, must also condemn England in the judgment of an impartial posterity.

EXCESS PROFITS.

The contemplated imposition of the new fangled excess profits bill is, in my opinion, also going to be a huge load upon the industries of the country. It is a wanton and deliberate breach of the undertaking to the contrary given by the Government of India in March, 1917. It gives the direct lie to the promise of an active industrial policy outlined in the Montagu-Chelmsford reform proposals and in the report of the Industrial Commission. It is wrong in principal unequal in its incidence, and is totally indefensible from an industrial point of view. It will seriously impede the expansion of existing industries and the initiation of new ones. It is almost a levy on capital and freely violates all the accepted cannons of taxation. If the profits the country has made owing to the special condition created by the war were great so are the losses now resulting from the tremendous dislocation that has followed its sudden cessation. It stands to reason therefore that if the Government wishes to have its share of the one, it cannot possibly repudiate its resposibility in the other. We are asked to suggest alternative sources of taxation. I venture to think that the war having been waged for the benefit not only of this but also of future generations, its burden must be eqitably distributed by a long-period loan and not be unfairly imposed upon the present generation alone: or, in the alternative, the money required should be found out of tariff arrangements, as for instance, by the imposition of import duties on various articles. The Government having already accepted the principle of imposing duties for revenue purposes, ought not to find it difficult to do so. In short, I am emphatically of opinion that the proposed measure is an exceedingly obnoxious and inequitable one, and that the country should stoutly resist its imposition.

FISCAL AUTONOMY.

We must also set our face against the proposal of what is called *Imperial and Allied Preference*, unless meanwhile India is given fiscal autonomy and full control over her tariffs. In our present helpless economic and industrial condition we cannot possibly afford to be charitable to others out of sentimental considerations. To a student of our trade returns it is painfully evident that at present India is almost entirely an exporter of raw materials and a heavy importer of nearly all her requirements of finished products. In a word, therefore, the compulsory inclusion of India in any such scheme of perference will be tantamount to forcing India to sell her raw materials to the different parts of the Empire or her Allies, cheaper than she can sell them elsewhere; and compelling her to buy her entire requirements of finished products from England and her Colonies and allies, at rates higher than those prevalent elsewhere.

In order that such and similar iniquities may not again be prepetrated in the future in the name and under the excuse of Imperial exigencies and in order that we may be enabled to adjust our own tariffs to suit the peculiar requirements and conditions of our country, it is absolutely necessary that India should have complete fiscal autonomy. Nothing short of this will satisfy the people of this country; nothing less will enable her to become industrially independent and great; and India should not rest content unless and until she has got it. It is pure camouflage to urge that the possession by India of fiscal freedom and her unrestrained use of it to protect her infant industries, will clash with England's free-trade policy. I hope there is no one so foolish in India still existing as to take such an argument seriously at this stage of our history. If the colonies can remain in the Empire and still arrange their tariffs in their own advantage and for their own benefit even against England; if they can thus advance their own interest without damaging those of the Empire, I fail to see why India cannot; unless it is sought to be made out in so many words that India is to continue to be the Cindrella of the Empire for all times and that what other parts of the Empire can claim with justice and obtain as a matter of right, India cannot. It is no exaggeration to say that this country will not regard any settlement about her industries as satisfactory, unless this question is solved according to her wishes and her requirments.

BRITISH FREE TRADE.

Speaking of the policy of free-trade that is forced on this country by England, we must clearly realise that it means, in other words, protection for England. This was admitted by even so anti-Indian an Imperialist as Lord Curzon in one of his utterances. If we had fiscal freedom and were allowed to impose duties on imports to protect our industries, it would bring more money into the pockets of the manufacturers, which, when full, would enable them not only to develop their own industries but would also afford ways and means for exploiting the markets of the world. I fail to see why England should thus protect her industries at our expense by compelling us to keep our doors open to receive her goods duty free. Whilst even such highly advanced and scientific countries like Germany, America

ıd Japan were forced to take the aid of tariff in :der to develop their resources, poor India is expected by the Government, and I am sorry to add, ,en some Indian faddists, to build up her industries ·ith the help of science alone. It must be remem-ered that though in the building up of industries, :ience is a great and important factor, it is by no ıeans everything. It is a patent fact that Germany ·ied free trade after the Franco-German War but ad to abandon it in 1879. France also tried her and at it but failed. England, after building up er nascent industries with huge protective walls :tending over centuries and wiping our infant ıdian Industries out of existence by imposing on ıem, among other measures, prohibitive import uties, in some cases equivalant even to 80 per cent ; now maintaining her trade with India and forcing er goods into India, through indirect protection of ıis character.

Exploitation of India.

While on this subject, I cannot resist the tempta-on of allnding to a reference that was made about wo years ago in the Houses of Commons to free-:ade by Mr. Bonar Law which is sure to be of in-:rest and is certainly not without its significance. Ir. Bonar Law, in the course of a discussion, said ıat India knew very well that free-trade was not ɔr India's benefit and that it was mere hypocrisy for :nglishmen to say that it was for her benefit. Lord :rewe, the then Secretary of State for India, said ı reply that it was very wrong of a person in the osition of Mr. Bonar Law to say that free trade ıat England had imposed on India was for Eng-ınd's benefit; and that such sentiments ought not ɔ have been expressed in England as they were sure ɔ affect the feelings of the people of India. Mr. Bonar Law maintained that what he had said was erfectly true; but as far as England was concerned, e wanted India to be a free-trading country, as her ıarkets were very precious for England; and added ıat he asked this of India in return for services :ndered. The sum total of this discussion ladies nd gentlemen, is that both sides want to exploit ndia. The aim is identical; the difference is nly one of method. We are often told that Eng-ınd will never allow India to impose duties on her oods. England has always declared that she is a :lfless Trustee and holds India for India's good. I m sure, I am echoing your sentiments when I say ıat she has no title to such a claim so long as she ersists in maintaining, in this and similar other ıatters of equal importance, such an unreasonable nd outrageous attitude, as I have endeavoured to escribe.

Conclusion.

If the report of the Commission is remarkable for the boldness and originality of the recommendations it makes for the future, it is no less so for the many admissions it makes in numerous places of the defects of Government policy in industrial matters in the past. The measures now recommended, however, and similar other steps should have been taken more than half a century ago? and no Government with a full and adequate sense of its responsibility to the people over whom Providence has called it to rule, can be excused for neglecting these preliminary steps which are essential to the industrial development of any country. There is ample evidence of a very concrete and substantial character to enable us to come to the conclusion that on the whole the Government of India has not done its duty to this country in the past so far as its industrial needs are concerned.

With her vast natural resources, her inexhaustible supply of most raw materials, her abundant mineral wealth, her enormous population, her climatic conditions of every possible kind, there is little which India cannot achieve industrially; there is almost nothing which she cannot produce and manufacture. In industries at least, this country is fitted to give law to the world. Nature has dealt kindly and generously with her. It is only man that has neglected to do his duty by her. If India is to progress industrially, she should be left untramelled and allowed to find out her own peculiar requirements, to have complete control over her finances, to adjust her tariffs; and in short to work out her destiny in the best way suited to her. I wonder if British statesmanship will rise to the full hight of its stature and leave India free to develope the spirit, the genius and the soul of her people according to her wishes.

TOPICS FROM ECONOMIC PERIODICALS.

AGRICULTURAL EDUCATION.

The following address (taken from the *Tropical Agriculturist*) was given by the Director of Agriculture, Ceylon, to the Teachers of the Educational Conference on their visit to the Botanic Gardens and Experiment Station, Peradeniya, on Tuesday, August 20th, 1918:—

My address to Teachers assembled for the Teachers' Conference at Kandy will be brief as I wish to read an article prepared by Mr. Drieberg (unavoidably absent to-day), giving details concerning the actual progress that has been made during the past few years in that sphere where Agriculture and Education have been marching hand-in-hand in Ceylon, *viz.*, the School and Home Gardens attached to Primary Schools.

Before offering to you certain suggestions which should, I think, be accorded your careful consideration, I desire to accord to you on behalf of the Department of Agriculture a hearty welcome to the Royal Botanic Gardens and the Experiment Station at Peradeniya.

The Royal Botanic Gardens at Peradeniya date from 1821, and it is unnecessary for me to detail to you the various services that these gardens have rendered to the Colony of Ceylon, to its botany and its agriculture. The Experiment Station was opened in 1902 and has produced valuable data in connection with the cacao, rubber and tea industries.

It is not my intention to dwell upon these topics nor to go into a general discourse on agricultural education. Rather would I ask you to consider the education of the colony as it exists at present and whether you consider that it is fully designed to meet the requirements of the population.

The war has brought about in all parts of the Empire a recognition of the importance of education —more especially of technical education. It is obvious to all, that in the economic struggle that is bound to take place after the war, those countries which are not fitting themselves will be severely handicapped. This fact has been given more serious consideration in the Home Country and is receiving close examination in India. What technical education is to the country dependent upon industries, agricultural education should be to the country that is dependent upon its agriculture. If there is need for greater effort towards technical education for industry—equally under certain conditions there is need for greater effort towards agricultural education for agriculture.

Over sixty per cent of our resident population in Ceylon is directly concerned with agriculture, but is the provision that is being made for the general education of the country towards a rural or agricultural bias sufficient for its needs?

In our Primary Schools, whether they be vernacular or anglo-vernacular, the subject of Nature Study is taught through School Gardens. There are 369 Government Primary Schools to which School Gardens are attached, and 77 Grant-in-aid Primary Schools. Nature Study is a subject of high educational value and although it must clearly be kept in view that agriculture cannot be taught in Primary Schools, only good can result in an agricultural country from acquainting the elder children with some of the principles that underlie the art of agriculture. Whereas the subject of Nature Study can be taught with relative ease in rural districts where the environment of the school is entirely agricultural, it is more difficult in our large towns and cities. But I would urge that for this reason it should not be overlooked. Rather more should greater stress be laid upon the subject, in order to interest the pupils to make observations on Nature and to appreciate country surroundings. The establishment of Home Gardens has recently been undertaken. This movement is becoming popular and is possible of important extension. It conforms with the experience of the U. S. A. in rural schools and the great success that has been obtained there indicates that similar successful results may be expected in Ceylon.

From the Primary Schools we pass to the Secondary Schools. Science is taught in these schools I am aware. In the Kindergartens nature study is an important branch of the work, botany is continued in some schools in the junior classes, but ultimately the bulk of the science taught consists of chemistry and physics. Why is it that the science subjects should be solely chemistry and physics? Is it because they may be considered as examination subjects in which good marks can be obtained? Rather would I see a lower standard in these subjects, and that they be considered in their application to agriculture. Similarly should elementary geology, botany, zoology and physiology as applied to agriculture find there place with chemistry and physics in the Science Classes of our Secondary Schools and Colleges. Examining bodies will provide examinations in subjects if they are asked to do so. The

Cambridge authorities already provide for an examination in Agricultural Science and several Crown Colonies have adopted agricultural courses in their Secondary Schools. It is a matter of satisfaction to me that one of the Colleges of Ceylon is contemplating the adoption of an agricultural science course, but I would go further and state that in an agricultural colony such as Ceylon—a country destined to remain for many years to come agricultural—every Secondary School should be devoting all its energies on the science side to the teaching of Agricultural Science.

From the Secondary Schools we pass to the School of Tropical Agriculture in whose main building you are now assembled. The students for this school are carefully selected and are given an essentially practical course. Similarly special courses are arranged for Headmen and for the training of Teachers. In the future it is my hope to see similar agricultural schools established in the Northern Province, and Southern Province the Western Province or North-Western Province, and the provision of a much higher course at Peradeniya possibly in connection with the Ceylon University or University College.

The life work of our people is agriculture, and in recent years a very important part of the work of our professional men has been agriculture.

Technical education is being provided for in the Technical Schools, but agricultural education is also technical education, and in addition to the teaching of agricultural science in the Secondary Schools, provision should be made for technical schools for agriculture. Education in the hands of the administrator is a means to an end. It may be utilized as in the past, to the training of character, individualism and love of freedom so dear to us all, or it may be utilized as suggested for the Home Country in fitting the people for the forthcoming industrial struggle. What is the position of Ceylon? Let us look fifty years ahead. To-day Ceylon is agricultural. What will it be fifty years hence? Even then its mainstay will be agriculture. But the Competition in the products of tropical agriculture will have become more severe. It is our duty therefore to use all our efforts towards improving our knowledge of and training in agriculture. If we do not, what may be expected of our educational efforts? Already we have examples of countries with people weaned from the land. May not our position be the same.

There is at present a welcome desire for more education. Let there be a desire for more education towards agriculture before it is too late.

Further education will lead to an understanding and appreciation of a better standard of living. What will be the result if the means of providing for that better standard of living are not forthcoming? The improvement in agriculture must go hand-in-hand with the improvement in education. We are beginning, may I say, an educational awakening. Let us not close our eyes to the urgent necessity of directing our education along lines likely to be beneficial to our only industry of importance—Agriculture.

This education must not be confined to Nature Study in Primary Schools, and the more advanced course in technical agricultural subjects at the School of Tropical Agriculture. Throughout the whole of our schools attention should be given to agriculture and to the sciences that underlie its practices and principles.

THE SCHOOL GARDEN.

Mr. C. Driebreg, Superintendent of School Gardens in Ceylon, writes in the ***Tropical Agriculturist***.—

In an old book occurs the following passage: "As the use of of Gardens hath been the Inclination of Kings and the Choice of Philosophers, so it hath been the common Favourite of public and private men; a pleasure of the Greatest, and the Ease of the meanest; and, indeed, an Employment and a Possession, for which no man is too High or too Low."

That is pretty comprehensive summation of the value of the Garden, albeit quaintly put.

The original conception of a Garden is a place where one can rest—a spot dedicated to wholesome relaxation in which the worker could for a time forget his cares and renew his energies.

And this is the correct idea which should be associated with every Garden whether attached to the home or to the school. It is here that one should realize he truth of the oft-quoted lines.—

> One is nearer God's heart in a Garden.
> Than any where else on Earth.

If this is the true conception of the Garden should we hesitate to bring our little children into contact with it so that they may derive the solace, inspiration and power it can give them?

A recent contributor to the discussion on education referred to the out come of the work done in the generality of our schools as "arid erudition," and that I think pretty well describes it. What is wanting in our school boys, who so successfully pass examinations, is a lively interest in the world around them, and an intelligent appreciation of natural phenomena.

If there is anything that is calculated to supply this want it is the movement in favour of Nature Study and School Gardening. The two go together.

one being complementary to the other: and it is a mistake to try to disassociate them. Some people think that School Gardening is nothing more than a habby: but that is not so.

A member of the Board of Education in England refers to the work in the School Garden as "a natural gymnastic, bridging over the space that separates physical and intellectual growth, and supplying a link between learning and life."

PROF. GEDDES has said: "Of all the facilities which teacher and school board can provide, and which central authority can encourage, let me plead for the School Garden," which he terms "the fulcrum for our nature study efforts."

In one of His Majesty's Inspectors reports occurs the following: "While the boys are at work in their Garden they learn to keep their eyes open to all that passes, and to be alive to every change in earth and air and soil, and in all life that depends on them for sustenance. These changes they do not merely observe and forget ... ...The great advantage of a garden for nature study is that the field of observation is simple and definite, two limitations to elementary studies which it is of the highest importance to bear in mind."

LORD AVEBERY pleads strenuously for the study of plants *in situ*, since he says, they loose half their interest when they are gathered.

The leaves of plants in themselves are a study, and Ruskin, in a beautiful passage, thus refers to their attractiveness: "They take all kinds of strange shapes, as if to invite us to examine them. Star shaped, heart shaped, spear shaped, arrow shaped, fretted, friuged, cleft, furrowed, serrated, sinuated, in whorls, in tufts, in spires, in wreaths, endlessly expressive, deceptive, fantastic, never the same from foot stalk to blossom, they seem perpetually to tempt our watchfulness and take delight in out-stepping our wonder."

Twenty years ago the village schools in this colony were bare and uninviting structures, standing out bleak and menacing to the eyes of the little urchins who were unwillingly driven to them. To-day the majority of them are set amidst beautiful surroundings—each a veritable pleasance— to which the children are instinctively drawn by an attraction they cannot resist.

The origin of the modern School Garden is said to be traceable to a continental monk who in the year 1695 recognized the educational value of the Garden attached to his orphanage.

In a recent contribution on rural education to the *Journal of the Department of Agriculture, Ireland*, the writer refers to a School Garden and its functions: In the school Garden, he says, which should be attached to or near the school, the pupils are taught to grow and care for plants. Its size is of no consequence—it may be a quarter acre or more, it may be only a few square yards—it is the work done that matters. But the pupils not merely cultivate the Garden: they are taught to observe and to think,—to use there hands, eyes, and mind in conjunction—to think in realities not in symbols, since real objects and visible changes are brought before them.

The main objects of School Gardening may be thus summarized:—

1. To train the children to habits of observation and serve as a basis for Nature Study.
2. To brighten the surroundings of the School.
3. The relieve the routine of indoor woork with outdoor work of a pleasent and recreative nature.
4. To iustil order, neatness and good taste.
5. To cultivate a love of gardening.
6. To teach the dignity of labour and encourage an honest pride in the outcome of tbe work of one's hands.

Indirectly the School Garden also serves (1) as a training ground where the boys learn the cultivation of useful and ornamental plants, and lay the foundation of practical agriculture and gardening (2) as a means of disseminating seeds and plants (3) as an agency for the spread of information regarding new crops.

It was in 1900 that a definite policy for Ceylon regarding the establishing of School Gardens was decided upon.

In 1901 six Gardens were established: in 1902 there were thirty-six; 1903, fifty-five; 1904, Seventy-three; in 1905, a hundred and six; 1906, 132; 1907, 134; 1908, 180; 1909, 224; 1910-11, 246; 1911-12, 261; 1912-13, 329; 1913-14, 33; 1914-15, 343; 1915-16, 384; 1916-17, 403.

In 1912 School Gardening was made a subject for grant in grant-in-aid schools.

It will thus be seen that the movement has been growing fairly rapidly in the Island, and had a larger vote and more inspectors been available, the number to-day would be considerably greater.

For purposes of comparison the following figures will be of interest:—In England in 1902 there were 387 School Gardens: but in 1915 there were 3,100 garden schools out of a total of 19,000 elementary schools.

The number in Scotland for the year 1913-14 was 500; in Wales for the same period 213. In Ireland there were 70 School Gargens in 1912. Since when the number has increased to 126.

Originally there was but one inspector available to help the Superintendent; now there are 3. Additional assistants are urgently needed for the extension of the scheme.

The initial difficulties in establishing School Gardens were considerable. There were difficulties in securing suitable land and satisfactory water supply; while the objection of parents to the children doing manual labour was for time a serious obstacle. But by co-operation between the Agricultural and Education Departments, as well as the various revenue officers and the chief headmen, these difficulties and obstacle have gradually disappeared, while village folk have come to realize the value of the training which their children are receiving.

The attitude of teachers was at first not altogether favourable: chiefly owing to ignorance of the real object of the School Garden, and the way to set about the work; but to-day there is a very different state of affairs.

We have now a book of School Garden Regulation explaining very fully and clearly the aims and objects of the scheme, and providing useful hints to teachers and others interested in the working of School Gardens.

Elementary text books have also been adopted dealing mainly with plant life and the history and cultivation of common plants.

Further encouragement has been given to school children by the offer of prizes for Home Gardens, *i.e.*, Gardens established by the children themselves at their own homes. This extension movement is an appropriate corollary to the main scheme, and is calculated to bring its benefits home (in more than one sense) to the rural population.

Home Gardens should prove an important educative factor, giving, as they do, to the boys a sense of ownership and personal responsibility, encouraging in them the spirit of enterprise, and last but not least, making them realize the power (and pleasure) of production.

"Produce, Produce," says CARLYLE, "were it but the pitifullest infinitesimal fraction of a product, produce it in God's name!"

And yet how many there are who have gone through life without ever having made an honest effort to achieve something—just taking what comes to them: and all because their early training was defective. They had not the power to act much less to achieve and produce!

Another recent innovation has been the selection of Central School Gardens, where demonstrations in Nature Teaching and School Gardening are given, which the teachers and assistants from neighbouring schools attend. This is a move in the right direction, and is calculated to bring the school and the garden into closer touch with one another.

We are thus progressing, and I think bid fair to make the right use of the School Garden for the attainment of a great purpose, *viz.*, the acquisition of knowledge without sacrificing the power to act, thus following the sage advice of poet who wrote:—

"Let books and nature be their early joy,
And knowledge rightly honoured with that name,
Knowledge not purchased witn the loss of power."

ECONOMIC NOTES.

INDUSTRIES AND COMMERCE

Profits of Bengal Jute Mills.

An estimate of the profits of the Bengal jute mills during the first half of 1918 has been made in the Department of statistics from a detailed analysis of the published accounts of 36 jute mill companies (including one sterling company registered in the United Kingdom) whose accounts were closed during the half year. It is interesting to note how sterling companies are being transformed into rupee companies.

From 1914 to 1916 there were 9 sterling companies (including one French company working at Chandernagore); three of these were transformed in 1917 into rupee companies under the Indian Act. There are thus 6 sterling companies now working in Bengal, of which one is, as stated above, dealt with in the statistics for the first half of 1918. The other five companies which close their accounts in the second half of the year will be dealt with in the next statement, that is, for the latter half of 1918. The compilation of the data has been made uniform as far as practicable, and the 36 mills have been regarded as one mill. In all cases the profits have been shown after deduction of Indian income tax and super tax, because the amount of tax paid was not always shown separately in the Balance sheets but lumped with other items of expenditure under the head of "Manufacturing and other expenses." In the case of the sterling company the British income tax and the British excess profits duty have been deducted as well as the Indian income tax and super tax. The profits are shown before and after deduction of interest on debentures. Some companies have paid off their debentures, others are in the process of doing so, while others again have created debenture redemption funds out of surplus profits. Debenture interest is not shown separately in all the published accounts but the amounts have been ascertained as correctly as possible. No allowance has been made for despreciation as no uniform practice of writing off depreciation is followed by jute mills in Bengal. The results are summarised below as compared with the pre-war profits and the profits since the outbreak of war.

Profits of Bengal Jute Mill Companies.

Year		Number of Cos. whose accounts were closed during each half year	Profits before deduction of interest on debentures	Interest on debentures	Net profits (subjects to depreciation)	Ratio of net profits (Col. 5) to total paid up capital.
			Rs. (1000)	Rs. (1000)	Rs. (1000)	
1914	First half (pre-war)	31	6,490	994	5,496	10
	Second half	38	8,245	1,396	6,849	
1915	First half	31	17,045	10,07	16,038	58
	Second half...	38	55,260	1,374	53,886	
1916	First half	32	39,499	1,025	38,474	75
	Second half...	39	55,139	1,288	53,851	
1917	First half	34	26,678	959	25,719	49
	Second half...	40	40,035	1,174	38,861	
1918	First	36	72,800	950	71,850	73*

It will be seen from the above statement that the profits during the first half of 1918 have surpassed all previous records.

* This ratio has been calculated on the profits of only the first half of 1918.

INDIAN MINERAL PRODUCTION IN 1917.

The particulars below are taken from the Report of Dr. H. H. Hayden, C.I.E., F.R.S. Director, Geological Survey of India :—

Table below shows the values of the production of minerals for which returns are obtainable:—

Total value of Minerals for which returns of Production are available for the years 1916 and 1917.

Mineral	1916	1917	Increase	Decrease	Variation per cent
	£	£	£	£	
Coal	3,878,564	4,511,645	633,081	...	16·3
Gold	2,303,023	2,221,889	...	81,134	—3·5
Manganese-ore	1,487,026	1,501,080	14,054	...	·9
Petroleum	1,119,405	1,092,964	...	26,441	—2·4
Salt	728,358	983,157	224,799	...	34·9
Tungsten-ore	497,397	623,074	125,677	...	25·3
Saltpetre	607,488	527,666	...	79,822	—13·1
Lead and Lead-ore	428,383	510,539	82,156	...	19·1
Mica (*a*)	311,680	508,173	196,493	...	63
Building materials and road metal ...	209,334	249,776	40,442	...	19·3
Silver	88,687	237,216	148,529	...	167·5
Tin-ore and tin	39,302	66,533	27,231	...	69·3
Jadestone (*a*)	48,926	67,502	18,576	...	...
Monazite	37,714	56,489	18,775	...	50
Ruby, sapphire and spinel	37,513	51,831	14,318	...	38·2
Iron-ore	37,981	39,977	1,996	...	5·2
Copper-ore	3,259	30,162	26,903	...	825·5
Chromite	16,401	26,216	9,815	...	59·8
Magnesite	14,065	14,559	494	...	3·5
Clay	4,645	9,019	4,374	...	94·1
Steatite	2,628	6,470	3,842	...	146·2
Corundum	2,783	3,874	1,091	...	39·2
Alum	6,205	3,707	...	2,498	—40·3
Diamond	361	1,826	1,465	...	405·8
Ochre	941	1,630	689	...	73·2
Gypsum	745	1,034	289	...	38·8
Amber	157	684	527	...	335·7
Molybdenite	202	626	424	...	209·9
Bauxite	463	620	157	...	33·9
Graphite	1,501	542	...	954	—63·5
Asbestos	...	303	303	...	...
Agate	783	255	...	528	—67·5
Bismuth	...	163	163	...	...
Antimony-ore	503	139	...	364	—72·4
Platinum	46	19	...	27	—58·7
Total ...	11,916,469	13,351,364	1,626,663	191,768	12·4
			+1,434,895		

(*a*) Export values.

It will be seen that there has been an apparent increase of nearly £1½ million or 12½ per cent in the value of the total production over that of 1916. The value figures, however, are largely artificial. In some instances although the output has fallen in quantity, it has increased in value; such increase does not necessarily give a true indication of the state of an industry, since the prevailing high freight and increased cost of production have in certain cases resulted in the closing down of all but high-grade propositions.

MINERAL CONCESSIONS GRANTED.

The number of mineral cocessions granted during the year amounted to 574 as against 532 in the preceding year; 515 of these were prospecting licenses and thirty nine mining leases. As in the preceding year, most of the increase is due to prospecting activity in Lower Burma.

CHROMITE.

The remarkable rate of increase in the production of chromite recorded in the preceding year was not maintained in 1917. There was, however, an increase of over 34 per cent in the output. This was due almost entirely to operations in Baluchistan, where the output was more than doubled, There was a slight increase in the Singhbhum production, and a decrease in Mysore.

COAL.

There was an increase of nearly a milliou tons or 5½ per cent and a proportionately greater increase in value—16·3 per cent—in the output of coal. The pit's mouth value increased largely everywhere, except in the case of Hyderabad. There was an increase of Rs. 9 per ton in pit's mouth value in the North-West Frontier Province, but as the output is less than 100 tons, the figures for that province may be left out of consideration. In the fields of Bengal, Bihar and Orissa, the rates of increase were respectively Re. 0-6-4 and Re. 0-6-0 per ton.

There was a fall of over 50 per cent in the amount of coal exported, and a small rise in imports. The total amount of coal, coke and patent fuel imported, however, was only 37,626 tons. The quantity exported was 408,117 tons against nearly 882,000 tons in 1916.

There was a general increase in the output of coal in most provinces, with the exception of Baluchistan Bengal, Central India the Rajputana. The decrease in Bengal amounted to nearly 361,000 tons; Bihar and Orissa, on the other hand, shows an increase of over a million tons, the Central Provinces nearly 84,000 tons, and Hyderabad over 65,000 tons. The decrease in the output of the Bikner coal-field in Rajputana amounted to more than 50 per cent as compared with the preceding year.

The average number of persons employed daily in the coal-fields increased by nearly 11,000 or rather less than 7 per cent. The average output per person employed was 108·88 tons as against 110·21 in the preceding year. The total number of fatal accidents was 172 or 1·02 per thousand persons employed.

COPPER.

There was a large increase in the output of copper ore in Singhbhum from 2,173 tons, valued at £30,259 in 1916 to 20,108 tons valued at £30,162 in the year under review. It is hoped that the smelting operations of the Cape Copper Co., will soon result in a considerable increase in output.

DIAMONDS.

The output of diamonds was again insignificant, being only 18·2 carats. The value (£1,827), however, shows a marked increase over that of the output of the preceding year.

GOLD.

There was a further decrease amounting to 24,000 oz. in the output of gold. As in the preceding year, this was due chiefly to fall in the Kolar production. There was also a fall of over 5,000 oz. in the Hyderabad fields and of nearly 2,000 oz. in Madras. The output in Singhbhum increased from 864 oz. to 2,462 oz.

GRAPHITE.

There was a considerable reduction in the production of graphite in Kalahandi, where the output fell from 252 tons, valued at £168, in 1916 to 60·4 tons, valued at £242, in the year under review, while in Rajputana there was a still greater fall from 1,066·4 to 423 tons valued at £305.

IRON.

There was a small rise in the output of iron-ore. The Tata Iron and Steel Company produced 167,870 tons of pig iron and 114,027 tons of steel including steel rails, while the Bengal Iron and Steel Company produced 80,262 tons of pig and 2,256 tons of cast-iron castings. In the Central Provinces there was a slight increase in the number of indigenous furnaces at work, 312 being operated during the year; at the same time there was a fall in production.

JADEITE.

There was a slight increase in the output of jadeite produced in Burma from 3,783·37 cwt. in 1916 to 3,961·28 cwt. in the year under review. There was a very marked increase in the value from £9,315 to £28,931. This increase is attributed to a preponderance in the output of the high-grade qualities used for jewellery and other ornamental purposes.

LEAD.

There was a very large increase in the output of ore from the Bawdwin mines, which rose from

about 15,000 tons in 1916 to over 71,000 tons in the year under review. There was not, however, a commensurate increase in the amount of lead extracted which was only 16,962 tons, as against 13,790 tons in the preceding year. There was an increase of over 100 per cent, however, in the quantity of silver extracted, which amounted to 1,580, 557 oz. in the 1917 as against 759,012 oz. in the preceding year.

MAGNESITE.

There was a further slight increase in the production of magnesite, which rose from 17,640 tons in 1916, to 18,202 tons, valued at £14,559, in the year under review.

MANGANESE.

There was a slight fall in the production of manganese, but at the same time the value of the output was higher than that of the preceding year. This, of course, is due to the artificial conditions prevailing at present.

MICA.

As in the case of mangnanes, there was an apparent fall in the amount of mica produced, but a rise in the value of the output, the total production in 1917 being returned as 40,907·6 cwt. valued at £141,605. The amount exported, on the other hand, was 62,434 cwt. or over 50 per cent. more than the quantity reported as produced in the country. This cannot be due entirely to stocks held from previous years. and as has been pointed out before, indicates imperfect returnes. Owing to the recent heavy demand for mica and to the higher prices offered, there was increased activity in mining during the past year, and there is very little doubt that the output figures are too low. There is a thriving trade in mica theft in some of the mining areas, and stolen mica naturally does not appear in the output returns.

MONAZITE.

The production of monazite in Travancore rose from 1,292·48 tons valued at £37,714 in 1916 to 1,940·3 tons valued at £56,489 in 1917.

PETROLEUM.

There was a decrease of over 14 million gallons in the output of petroleum in Burma and India, the total production being 282,759,523 gallons. The production of the Yenangyaung Oil-field fell from nearly 199 million gallons in 1916 to 176,979,020 gallons in the year under review. The yield of the Singu Oilfield was 85,639,166 gallons, approximately the same as in the preceding year. There were slight increases in the outputs of the Yenangyat and Minbu fields, but a falling off in Kyaukpyu. In Assam the output of the Digboi Field increased by over 1 million gallons, or nearly 23 per cent, while the new Badarpur field in Assam produced nearly 3 million gallons. In the Punjab, the Attock Oil-field increased its production more tean three-fold, the output having risen from a little over 112,000 gallons to 618.528 gallons in 1917.

The imports of kerosene oil decreased largely in 1917, being only a little over 33 million gallons as compared with nearly 60 million gallons in the preceding year. 438,888 cwt. of paraffin wax, valued at £669,479, were exported.

PLATINUM.

The output of platinum fell to almost nothing, being only 3·79 oz.; this was obtained, as usual, during the dredging operations of the Burma Gold Dredging Company at Myitkyina.

RUBY, SAPPHIRE AND SPINEL.

There was a slight decrease in the output of the Ruby Mines during the year under review. The estimated value of the output, however, rose to £51,831.

SALT.

There was a slight decrease in the amount, and a slight rise in the value, of the output of salt in 1917 as compared with that of the preceding year. There was also a slight decline in the amount imported, from 446,069 tons, valued at £1,260,295 in 1916, to 341,986 tons valued at £1,360,093 in the year under review.

SALTPETRE.

The production of saltpetre fell from over 25,000 tons in 1916 to 21,283·8 tons valued at £527,666 in 1917. Most of the reduction occurred in the United Provinces. There was an increase in the quantity exported, which amounted to 515,374 cwt., valued at £677,856, in 1917 as against 485,000 cwt. in the preceding year.

SILVER.

Practically the whole of the silver production comes from the Badwin lead-zinc mines, which, as already stated (see *Lead*), produced 1,580,557 oz. in the year under review. The Anantapur gold mine in Madras also produced 1,281 oz.

TIN.

There was a considerable increase—amounting to 43 per cent—in the amount of tin-ore produced. This all came from Burma, which yielded 13,326 cwt. valued at £65,533. 2,817·9 cwt. of block tin were also produced in Mergui district as the result of local smelting operations. The imports of black tin amounted to 28,180 cwt., valued at £292,135.

N.B.—The tin-ore of the Southern Shan States is produced in the form of mixed cassiterite-wolfram concentrates; the output is therefore returned in

terms of the mixed concentrate, the approximate composition of which is usually 43 per cent wolfram to 57 per cent cassiteriate. The total figure for 1917 is 14,239 cwt.; for the purposes of this *Review* it has been assumed that 8,088 cwt. of this represent tin-ore and the remainder wolfram.

TUNGSTEN.

The production of wolfram rose by nearly 22 per cent, from a little under 3,700 tons in 1916 to over 4,500 tons in the year under review. The Central Provinces have now ceased to produce, and there has only been a small increase in the output in Singhbhum. The output of the Degana mines in Rajputana has increased somewhat but is still insignificant, the absence of water being a serious handicap to efficient treatment of the material. Over 80 per cent of the total output of wolfram came from Tavoy, where the industry has shown highly satisfactory progress, the production having increased by nearly 75 per cent during the last two years.

WAR TRADE OF JAPAN

Prosperity of Commerce and Industry.

During the four years of war it has been inevitable that the economic market of Japan should have been greatly affected both directly and in consequence of the economic dislocation in Europe and America. A brief review of the leading features of Japan's foreign trade, taken from a statement issued by the Department of Finance, is therefore of great interest, says the *Board of Trade Journal.*

THE PRE-WAR PERIOD.

At the time preceding the outbreak of the War, Japan had been suffering from the effect of the extraordinary reaction that followed the boom in all spheres of activity after the close of the Russo-Japanese War. The trade and industries were then depressed, the balance of trade continued adverse, and the supply of money was always short. Both the Government and people had to follow a negative and retiring policy in financial and economic affairs. All ideas of launching new undertakings were repressed as much as possible, the flotation of new foreign loans was discontinued, the primary motive actuating them being how to give relief to the straitened condition of national finance and to lighten the burdens of the people.

OUTBREAK OF THE WAR.

When the War broke out in July, 1914, and Japan entered it on the Allied side, sending an expedition to capture Tsingtao, the effect exerted on her economic market was on the whole unfavourable. The agitation that had come over the money market in Europe adversely affected that of Japan, and her bankers were persuaded to adopt the policy of contraction. Then the increased peril at sea, with abnormal rise of insurance rates and the disturbance of foreign exchanges, combined to retard the movement of foreign trade. The slump of the staple export, raw silk, was a hard blow.

Fortunately the influence of all unfavourable factors on the market was not so serious, chiefly owing to the fact that Japan is remote from the theatre of war, and also to the restrictive financial policy pursued for many years before by the Government. It was not long before a favourable turn set in for her market.

FINANCIAL YEAR, 1915-16.

The economic market that was temporarily hit by the War was followed in 1915-16 by an unprecedented activity brought about by various causes. In the first place, the arrival of large orders for munitions from the Allies, and similar orders from the Eastern countries and the South Seas, where the far imports from Germany and other belligerents had ceased to come, enlivened the export trade. In the second place, the scarcity of freight space throughout the world, and the abnormal rise of charterage of Japanese ships engaged in foreign trade, brought in its train a phenomenal activity in shipbuilding. Again, the sudden shortage of imported chemico-industrial productions, and of machines and machinery, and the abnormal advance of their quotation, stimulated the launching of enterprises in those lines at home. Lastly, the marked accumulation of funds owing to the combined result of the first two factors facilitated the expansion of trade and industries.

SITUATION IN 1917.

Though in the early part of the year the general economic tendency continued brisk the enlargement of the sphere of the War soon began to work adversely against the export trade both from external and internal causes, the former from the restriction placed on the consumption of various articles and the ban enforced on both imports and exports. Then in Japan, as counter measures actuated by those special arrangements abroad, shipment of a number of articles was prohibited while the money market, currency, prices and freight market were placed under control. In the latter half of 1917 the economic market entered a new era a predominant note of

which was one of restraint in various directions, quite a striking contrast compared with the two preceding years. It was fortunate that the accumulated funds that accured from the previous period of prosperity saved the market from sustaining any heavy blow, and enabled it to pass the year on the whole satisfactorily.

FOREIGN TRADE.

During the period from August, 1914, to the end of 1917 Japan's exports totalled Yen 3,798,000,000 (£389,019,769), against imports amounting to Yen 2,623,000,000 (£268,667,418), leaving balance of Yen 1,175,000,000 (£120,352,351) in favour of exports.

This is a striking contrast compared with the period prior to 1913 inclusive, when the total volume of trade rarely reached the level of Yen 700,000,000 (£71,699,273), while as to balance of trade it was only in a single year that the Customs returns recorded excess of exports over imports during the ten years indicated, the balance being the other way for the other nine years.

This enormous shipment to foreign markets was due, classified by kind of commodities, to large orders for grain, cotton goods, raw silk, copper, steamships and miscellaneous goods—orders being specially heavy from America, India, China and the South Seas.

The thriving foreign trade, coupled with similar activity in the shipping business, yielded a large credit for Japan in her international account, this credit amounting to Yen 751,000,000 (£76,923,077), of which Yen 328,000,000 (£33,596,231) was brought home.

DEVELOPMENT OF DOMESTIC INDUSTRIES.

The prosperity of foreign trade and the non-arrival of certain class of imports supplied a strong encouragement to the rise of industrial enterprises. Of agriculture, it is sufficient to say that its productions, favoured by seasonable weather coutinued to record a steady increase; but it was in the two spheres of industrial activity, manufacture and mining, that a notable progress was noticed, especially in the former, due to sudden rise of manifold industries in which chemical, mineral, textile, smelting and shipbuilding industries were most conspicuous. The activity in mining enterprise was most marked in increased output, the total value in 1917 being doubled compared with 1914. Among the productions, silver, copper, coal, iron and sulphur contributed most to the total.

The total amount of investment in the creation of the new and the expansion of old undertakings reached Yen 2,200,000,000 (£225,340,572), the greater part of which went to manufacturing industries and mining.

MONEY MARKET.

The sudden appearance of sundry enterprises, and the issue of nn small amount of Government securities, did not particularly affect the money market; on the contrary, it remained easy in consequence of a large inflow of money from abroad.

Thus the total volume of banking deposits rose from Yen 2,000,000,000 (£204,855,065) at the time of the outbreak of the War to Yen 4,800,000,000 (£491,652,156) as existing at the end of 1917. The rate of interest fell throughout the country. In Tokio the ruling rate that stood at first at 8·3 per cent. a year fell to 5·9 at the end of 1915, to rise slightly afterwards, that is, 6·2 per cent. or thereabouts at which level the market has long remained stationary.

Another sign of the times was a marked rise of the average quotation of stocks; what did not exceed Yen 48 at first stood at Yen 104 at the end of 1917. This state of affairs was also reflected on the market price of commodities, it rising about 70 per cent. in 1917. The volume of currency swelled high, and the Bank of Japan's convertible notes in circulation rose at the end of 1917 to the record figure of Yen 830,000,000 (£85,014,852), as against Yen 330,000,000 (£33,808,086) at the end of July, 1914.

FINANCIAL SUPPORT TO THE ALLIES.

The favourable development on the whole of Japan's economic market has relieved the country on the one hand from the financial pressure that was weighing upon it in consequence of the Russo-Japan War, and on the other apparently has paved the way for her industrial and trade expansion in future. When it is remembered that the progress was mainly due to causes suddenly coming from without, there is greater need for solidifying its foundation internally.

Japan's endeavours to promote the common cause of the Allies is not confined to operations on land and sea. The extension of financial support to them, so far as circumstances admitted, also claimed earnest attention on her part. In this respect Japan generally followed the plan of devoting the money obtained from abroad since the War to contribute to the support of the Allies, either by subscribing for the loans issued by them or by purchasing their bonds.

The total amount invested in all those securities reached at the end of 1917 Yen 1,1159,000,000 (£118,713,510), consisting of Yen 530,000,000 (£54,286,592) in British Government bonds Yen 254,000,000 (£26,016,593) in Russian Government bonds, and Yen 155,000,000 (£15,876,268) in French Government bonds, to which is to be added Yen 220,000,000 (£22,534,057), representing Japanese foreign loan bonds and company debentures redeemed in foreign market.

In short Japan devoted nearly the whole of her favourable trade balance from the beginning of the War to extending financial support to the Allies.

FINANCIAL AND ECONOMIC CONDITIONS COMPARED WITH THOSE BEFORE THE WAR.

	At the end of July, 1918.	At the end of July, 1914.	Increase (+) Decrease (−)	
	Yen.	Yen.	Per Cent.	
Amount of National—				
* Debts outstanding	*2,529,655,353	2,530,162,513		0
Coins in Circulation	208,597,967	179,118,470	+	16·5
Bank of Japan—				
Note issued	770,219,218	331,035,396	+	122·7
Specie Reserve	645,076,810	216,503,420	+	198·0
Tokio Associated Banks—				
Capitals paid up	202.853,138	143,305,525	+	41·6
Deposits	1,663,420,716	439,100,360	+	278·8
Loans and Discounts	1,407,012,303	490,108,937	+	187·0
Osaka Associated Banks—				
Capitals paid up	94,564,935	50,287,625	×	88·0
Deposits	1,081,043,714	233,319,450	+	363·3
Loans and Discounts	991,607,451	319,910,506	+	210·0
Deposits in the Post Office Savings Bank ...	491,670,000	201,687.725	+	143·8
	One year ending 31st July, 1918.	One year ending 31st July, 1914		
Government Railway—				
Gross Earnings	187,633,022	110,511,876	+	69·8
Foreign Trade—				
Value of Commodities exported	1,793,568,077	663,465,643	+	170·3
Value of Commodities imported	1,483,986,923	696,485,258	+	113·1
Total	**3,277,555,000**	**1,359,950,901**	...	**141·0**
Excess of Exports	309,581,154	—		—
Excess of Imports	—	33,019,615		—
Amount of Bills cleared in the Clearing Houses throughout the country	42,670,739,448	10,725,252,142	...	217·9
	For July, 1918.	For July, 1914.		
Average Price of Securities (in Tokio)	109.116	47,965	...	127·5
Average Index Number of Prices of Commodities (in Tokio)	25,627	12,575	...	103.8

* Excluding the amount of certain Special Exchequer Notes.

LAND FOR PUBLIC USE.

Proposed New Methods of Valuation.

The Ministry of Reconstruction have now issued, says the *Board of Trade Journal*, the Second Report of the Committee upon the Acquisition and Valuation of Land for Public Purposes, of which Mr. Leslie Scott, K.C., M.P., is Chairman. Their First Report, which was issued last January, recommended measures for cheapening, shortening and simplifying procedure for obtaining compulsory powers for the acquisition of land, a procedure so cumbersome as to involve a delay of many months, and costs if anything from £500 upwards. In their Second Report the Committee devote attention to a suitable system for the valuation of land compulsorily acquired for public purposes.

PRESENT LEGAL POSITION.

The existing legal provision for dealing with such valuation is based upon the Lands Clauses Acts, the chief of which dates back to 1845. The experience of two generations has shown, the Report states, that this Act and the Amending Acts require re-consideration in order to give effect to the requirements of the community of to-day. The Lands

Clauses Acts are out of date, and should be replaced by a fresh Code.

NEW CRITERION OF VALUE TO OWNER.

Sums paid for property taken for public purposes have for many years past been frequently excessive, For this result it is impossible to assign any one cause, and the Committee deal in detail with several. Their main recommendation is that the basis of "value to the owner," which has hitherto been adopted as the criterion for such valuation under various judicial decisions (though no such criterion was, *in fact, specifically laid down by the* Lands Clauses Acts of 1845) should be replaced by a general standard of value to be paid to the owner, which is defined as "the market value as between a willing buyer and a willing seller." In addition to this value the owner would be entitled, under the Committee's proposals, to payment for consequential injury or any actual loss to him involved in the taking away of his land.

The Committee do not think that the fact of his land being acquired under compulsory powers for the public benefit should entitle an owner to additional compensation on that ground alone. They urge therefore that the conventional allowances for compulsory purchase (which in England and Wales is normally 10 per cent, and which in the case of agricultural land in Scotland has, in practice, resulted in giving 45 years' purchase of the gross annual value, representing in recent years nearly 100 per cent allowance) should be discontinued.

There are certain other corollaries following from the adoption of this standard of "market value" which are important, and for which special provision is made in the Report. On the vexed question of what is known as "special adaptability," the Committee recommend that an owner should not be entitled to any increased value for his land which arises solely from the adaptability of the land in question for a purpose to which it could be applied only under statutory powers. The adoption of this principle would put an end to the payment of excessive values for land required for reservoir sites, railways and other undertakings of a public nature which can only be initiated if statutory powers are granted by Parliament for the purpose. The high valuations which have handicapped such improvements in the past have been based largely upon hypothetical competition between different promoters requiring the land for the same purpose. Only one of these promoters could, in fact, have obtained the necessary statutory powers: the competition, therefore, upon which such values are based is imaginary.

The Committee further recommend that no enlargement of market value shall be taken into account which arises from the use of the land in a manner contrary to sanitary or other laws and *regulations (as illustrated in the provisions of the* Housing of the Working Classes Acts, 1890, in regard to premises in an unhealthy area, where such premises are overcrowded, insanitary or unfit for human habitation.)

NOTICE TO TREAT.

The Committee made various recommendations with a view to giving promoters greater freedom in acquiring and disposing of properties required for *their undertaking. They shall not be compelled to* purchase any interest in land which is not required for the purpose of their undertaking, and they shall be able to specify in the "notice to treat" the date on which such notice is to take effect in regard to any interests which they do require. They shall have power to take part only of a property whenever they think fit, and to acquire rights of access or other easements over or under land whenever *such rights or easements will, of themselves,* be sufficient for the purpose of their undertaking. They shall further be entitled (on payment of all proper costs and compensation) to withdraw their "notice to treat" within two months of the delivery of the claim (which should cleanly set forth all items in respect of which compensation is demanded) or within such other date as may be directed. Finally, the promoters shall be entitled to use land free from any existing restrictions on its use (subject to payment of compensation to any persons actually damaged by the breach of such restrictions) and able, subject only to certain limitations in very special cases to hold and dispose of surplus lands not required for the purpose of their undertaking.

ASSESSMENT OF COMPENSATION.

An important question to which the Committee devote special attention is that of the constitution of the Tribunal for assessing compensation. They are unanimous in recommeding that assessment by juries and by Justices of the Peace and stipendiary magistrates under the existing Acts should be abolished, and that the system under which two arbitrators and an umpire are appointed to adjudicate in such cases should be discontinued. Parties should, of course, be left free to appoint a single arbitrator on their own account if they agree upon the arbitrator to be selected; but if they do not so agree, the Committee recommned that the Tribunal should consist of a single arbitrator appointed by the Sanctioning Authority (the estiblishment of which was recommended in the first Report) from a panel consisting of eminent surveyous and other experts. At the same times, they provide that surveyors appointed to this panel, if they continue in private practice, should give an undertaking that so long as

they remain on the panel they will not give evidence in disputed cases on be half either party. It is hoped that by this provision it will be possible to obtain the services of eminent and practical surveyors upon the panel from which arbitrators are to be selected, but that the anomaly will be avoided of having the same men appearing alternatively as judges and as advocates from day to day in the same class of case.

While the Committee think that a single arbitrator so selected will usually constitute the most suitable form of Tribunal for assessment of compensation, they provide that if either party desires it, the Sanctioning Authority shall have discretion to order a larger and special Tribunal. They further recommend that the Sanctioning Authority shall be empowered to make rules as to the procedure to be observed by the Assessment Tribunal, but that the Assessment Tribunal, in order to possess powers of penalising obstructive action, shall have absolute discretion over costs. Taxation returns in the possession of the Inland Revenue Valuation Department should be produced on request by the Assessment Tribunal. Appeals should be allowed to the High Court of Justice on any disputed question of law.

"BETTERMENT."

Another vexed qnestion is that of what is known as "Betterment." The Committee think that the general principle of "betterment" and "corsement" (for which latter term in their Report they substitute the term "injurious affection" in a larger sense than that in which it is normally recognised under existing law) should generally be correlative. They attach much importance to an extended application of the principle of "betterment" on the ground that if persons whose property has been enhanced in value by public improvements are made to contribute to the cost of such improvements by means of a "betterment charge," there will be more inducement for promoters to undertake schemes (likely to develop the resources of the nation and the amenities of national life) which are in danger of being hampered of indefinitely postponed for financial reasons under the conditions likely to obtain after the war. In normal cases the Committee limit the percentage of such enhanced value which is to be contributed by the owner to 50 per cent.

Where the State is the promoter, the State should retain the whole of the "betterment charge." Where a local authority is the promoter, the Sanctioning Authority should decide whether the whole of the "betterment charge" should be retained by that authority or whether some proportion should be paid to the State. In the case of a private promoter, his share in the "betterment charge" should be limited to the actual cost of construction of the works involved in his undertaking.

One of the main difficulties encountered in the past in applying the principle of "betterment" in a way which can practically assist the promotion of valuable public undertakings has been the heavy weight of costs involved in procuring the two sets of valuations of the land in its original condition, and of the same land after its enhancement by the public works in question. For this purpose the Committee recommend an extended utilisation of machinery already in existence in the Inland Revenue Valuation Department.

"INJURIOUS AFFECTION."

As to compensation for "injurious affection," the Committee recommended that its operations should be confined to (a) damage arising directly from the taking of the land, such as severance or disturbance of occupation' in respect of which compensation should be paid in the general course; and (b) damage arising directly from the construction or use of the works in question, as to which damage the Sanctioning Authority should exercise discretion in determining whether compensation should be allowed or not, according to the circumstances of the case.

"RECOUPMENT."

The committee are not generally in favour of a system of what is known as "recoupment" *i.e.*, the giving of powers to take land beyond what is necessary for the authorised works, in order to secure the enhanced value created by such works. They think that any general application of such a principle might have undesirable results in a tendency to speculation in land by public authorities, and that the general purpose of securing to the public some proportion of the enhanced value of land arising from enterprises of a public nature would be better served by the imposition of a "betterment charge" under the conditions which they recommended. But they think that acquisition of land for purposes of "recoupment" should be permitted in the case of State improvements, or where the land is required for the reinstatement of displaced interests or for the efficient development in the future of a specific undertaking.

They conclude by saying that a simple, quick and economical system for the acquisition of land is essential alike to the development of the nation's resources and to sound progress, and that a new code established by legislation to replace that embodied in the Land Clauses Acts should involve a more complete acceptance of the principle of expropriation in the public interest than that which has prevailed in the past.

INDUSTRIES AND COMMERCE.

Investigation of Vegetable Dye-Stuffs in Japan.

The British Consul at Shimonoseki writes to the *Board of Trade Journal*:—

Considerable attention has been devoted of late to the exploitation of the resources of the woods and fields in Japan with a view to the increase in production of vegetable dye-stuffs (owing to the present scarcity of chemical dyes), and recent research in this direction has met with success.

The Department of Agriculture and Commerce has caused investigations to be conducted throughout the country through the experts attached to the Prefectural Governments and to the various agricultural associations and the Forestry Bureau.

Some sixty varieties of trees and twelve varieties of plants have been found to have value as raw material for dyes. The director of the Forestry Bureau of Okayama has enumerated some of these as follows:—

Penus Densiflora (Japanese: Aka-matsu).—This tree is found throughout Japan in a wild state. A dark brown dye is extracted from the leaves, which are used for cotton yarn.

Pinus Thunbergu (Japanese: Kuro-matsu).—This common variety of pine gives a dark dye. A certain factory in Kagawa Prefecture extracts this dye as follows:—10 parts of fresh leaves are added to 3·3 parts sulphur and 10 parts sulphite of soda, and the mixture is heated with water for five hours. The resulting dye commands a ready sale.

Chestnut (Japanese: Kuri).—Also a common tree. Treatment of the bark with sulphide of copper gives a dye for saddlery wares. The leaves and bark also yield a black which is used for dyeing silk haori (outer garments). The root gives a yellow dye used in staining furniture and similar work.

Quercus Dentata (Japaneses: Kashiwa).—This tree is found generally in Japan. From a decoction of the bark a dye material is obtained, which is used for dyeing hemp, cotton, etc., khaki colour.

Quercus Serrata (Japanese: Kunugi).—The leaves are collected in September and fermented. The fermented leaves are boiled and yield both brown and deep green dyes.

Pomegranate (Japanese: Zakuro).—The bark of this tree gives a leather dye.

Pasania Cuspidata (Japanese: Shii.—A dye is made from this tree for fishing nets.

Camellia Japonica (Japanese: Tsubaki).—The leaves when pressed fresh yield a green which is used for dyeing cheap mosquito nets.

A tree called in Japanese "Motekoku."—This tree gives from the leaves a light brown dye.

Myrica Rubra (Japanese: Yamaromo).—The juice extracted from the leaves and bark gives a dye for fishing nets, also a priming for indigo dyeing, and is used for dyeing khaki uniform cloth.

Eleurites Cordata (Japanese Abura-giri). *Quercus Gilve* (Ichii). *Pagoda-tree* (Enju). *Juglans Sieboldii* (Onigurumi). *Raphiolepis Japonica* (Sharimbai), and several other trees yield dye material from their leaves, bark or roots.

Of plants form which dyes may be extracted may be mentioned the *Swertia Chinensis* (Senburi), *Lespedeza Pilosa* (Neko-hagi), and *Coptis* (Oren).

THE CHLORATE OF POTASH INDUSTRY.

Following the outbreak of the War the manufacture of chlorate of potash in Japan underwent a great development, but depression has resulted owing to over-production, high freights, and the disinclinataion of steamship companies to ship the chemical, owing to its dangerous character.

This industry is not of long standing in Japan, for, according to the *Japan Chronicle*, it was only in 1908 that the Nippon Kagaku Kogyo Kaisha began the tentative manufacture of chlorate of potash. This was the first undertaking of the kind in the country. It was not until 1912 that any considerable quantity of the article began to appear on the market.

During the war the suspension or reduction of imports sent up prices, and as a result a number of new producers made their appearance. The industry continued active up to last year, but the inevitable result occurred—over-production. This naturally led to a decline in prices, and the industry has since become depressed. The trade now depends chiefly upon exports to the United States and South America.

NUMBER OF FACTORIES ENGAGED.

According to investigations made by the Department of Agriculture and Commerce, at the end of 1917 there were 49 factories engaged in the manufacture of chlorate of potash. Their total capacity amounted to 10,000 tons a year, but the actual

output totalled only 6,000 tons, while the capital invested in the industry amounted to 6,000,000 yen.

About 60 per cent of the total output is representep by that of the Nippon Lagaku Kagaku Kogyo Kaisha, Nippon Denka Kogyo Kaisha, and the Kyushu Kido Kaisha, the other producers operating on a small scale. According to capacity, the 49 factories may be classified as follows :—

Monthly production.			Factories.
Over 1,000 barrels	...	...	3
Over 300 barrels	...	...	7
Over 100 barrels	...	...	15
Under 100 barrels	...	...	24
Total	...	...	49

Domestic Consumption.

The increase in the domestic demand is much less than that in output. No definite figures regarding domestic consumption are available, but there is reason to believe that before the war it amounted to about 3,700 tons.

The following figures represent the imports in recent years mentioned, the quantity being in kin (1 kin = about 1⅓ lb.) :—1907, 6,133,758 kin ; 1908, 4,431,868 kin ; 1909, 7,458,958 kin ; 1910, 6,092,342 kin ; 1911, 6,326,937 kin ; 1912, 6,654,317 kin ; average, 6 182,000 kin. The average of 6,182,000 kin works out at about 3,700 tons ; and, since there was practically no output in this country at the time, this figure may be taken as showing the domestic consnmption before the war.

Prospects.

It seems that the trade has now passed its height of prosperity, but prices are still high as compared with the pre-war quotations. In October about 50 yen per barrel was qaoted, compared with 15 or 16 yen before the war.

As to the future prospects, considerable doubt is expressed whether Japanese producers will be able to successfully compete with their British and German rivals. As a remedy it is urged that small-scale producers should combine, so as to increase their power of resistance against foreign competitors.

BOARD OF INDUSTRIAL RESEARCH.

For Mysore State.

The following Order, No. 4550-0—I. & C. 171-16-8, dated 28th November 1918, has been issued by the Government of Mysore :—

With a view to ensure continuous attention being paid to the development of Chemical, and other allied, industries in the State by systematic investigations into the possibilities of the economic utilisation of the natural resources of the State, Government have decided to establish a Committee composed of select Scientific and other Technical experts available in the State.

2. The Committee will be designated the 'Board for Chemical and Industrial Research and Scientific Advice' and will, to begin with, be constituted as follows :—

Chairman.—

Mr. P. Raghavendra Rao, Extra Member of Council.

Members.—

The Director of Industries and Commerce.
The Director of Mines and Geology.
The Director of Agriculture.
The Director of Public Health Institute.
The Chief Electrical Engineer.
The Professor of Physics, Central College.
The Professor of Organic Chemistry, Central College.
The Professor of Chemistry, Central College.

Secretary.—

Mr. S. G. Shastry, Industrial Chemist.

3. A working Committee consisting of five members will be appointed to attend to the actual work of investigation, distribution of work among the works and supervision over students under training, collection and publication of results. The Advisory Committee will meet once every quarter, or, as often as may be necessary; while the working Committee shall meet, at least, once every month.

4. The Board will be requested to send up to Government detailed proposals in regard to its functions, methods of work, etc. Approval of Government may be obtained, in the first instance, to such tentative proposals as are considered necessary to commence work pending formulation of more comprehensive proposals.

5. One of the first duties, however, of the Board will be to select, at once, a dozen subjects of immediate practical interest and to entrust the work of

invertigation to young men having the necessary capacity and aptitude.

6. For the present, the following laboratories will be utilised, as far as possible, for carrying on the work of the Board :—

1. Agricultural Department Laboratory.
2. Public Health Institute ,,
3. Central College Physics and Chemical Laboratories.
5. The Industries and Commerce Loboratory.

N.B.—If, and when, circumstances necessitate it, recourse may be had to, and help obtained from, the Laboratories of the Indian Institute of Science.

7. The Board is requested to proceed to distribute at once the work proposed to be undertaken among the several workers.

8. The Board may, after an experience of twelve months' working on the above lines, submit to Government detailed proposals regarding (i) co-ordinating and standardising the work of the several agencies employed on Research work, (ii) improving the organisation as a whole, and (iii) further outlay considered necessary on laboratories, etc., for developing the work.

9. Government are pleased to direct that a sum of Rs. 10,000 be placed at the disposal of the Chairman of the Board for the current year to be utilised, in the best manner possible, in giving effect to the provisional scheme as indicated above. The amount will be met by reappropriation from the lump sum provision for Development in the Industries and Commerce Department Budget.

10. Government direct that steps be taken to begin work from the 1st January 1919 and a report of progress made submitted to them once every quarter.

EDUCATION IN THE UNITED PROVINCES.

Addressing the Annual convocation of the University of Allahabad on Saturday the 25th January last, Sir Harcourt Butler the Chancellor of the University made an interesting speech. The following are extracts from it :—

Mr. Vice-Chancellor and Gentlemen,—I ask you to stand whild on behalf of the University I express our humble loyal sympathy with their Royal and Imperial Majesties and the Royal Family in their sorrowful bereavement I will convey our feeling to his Excellency the Viceroy and ask him to transmit it home.

I deem it a signal honour to preside at the Convocation of the University. When I first came to Allahabad in 1890, the University was just three years old. I remember the thoughtful inaugural address of Sir Alfred Lyall who gave us our motto, shaped our constitution, and realized a great measure of what he called 'autonomy in education' or 'provincial self-government in the sphere of education.' I promise you that I will do all I can to serve our University while I am Chancellor.

My first duty is to thank our late Vice-Chancellor, Dr. Sir Pramoda Charan Banarji, for the ability, tact and dignity with which he has presided over the deliberations and executive action of the University. I know that he undertook this heavy responsibility out of sheer public spirit. In welcoming Mr. Justice Piggott I need only say that we all admire his ability, enthusiasm and eloquence and his active sympathy with the rising generation.

The degrees which I have just has the honour to confer on Dr. Banerji and Dr. Ward are a fitting recognition of their high services to the study of law and of science. Dr. Ward is a veteran in education and commands the confidence of officials and non-officials, alike for his great ablities no less than for his sterling independence and devotion to his calling.

Losses of the University.

During the last year the University has sustained grievous loss in the death of five great men, my tried and close personal friends, Dr. Hill. Dr. Sir Sundar Lal, Dr. Venis, Professor Homersham Cox and Professor Gardiner Brown.

They all gave of their best to the University and their best was very good. Dr. Hill was a chemist of rare distinction and a principal and professor of high character and influence. Recent progress in science teaching is largely due to his initiative and example. I have paid more than one tribute to Sir Sunder Lal and to his long, honourable and beneficent connection with this University. He was the first non-official Indian to be Vice-Chancellor of any Indian University. It is, I feel, one of the meritorious acts of my official life that I suggested his name to my old chief, the then Chancellor, Sir James La Touche. Dr. Venis was principal of the Government Sanskrit College at Benares for thirty years aud for 17 years also he was principal of the Queen's College. He was one of the oldest members of the University, a fine scholar with a highly critical and cultivated mind, steeped in philosophy. No European has ever perhaps attained such knowledge of the traditional learning of Sanskrit. He was both a pupil and teacher of Pandits, living in close intimacy with renowned Pandits of the old school. An eminent Russian scholar once told me

that Dr. Venis had forgotten more than any savant in Europe had learnt. He will be remembered as a teacher rather than as a scholar, because he has left little printed work behind him. But he did more than any man of his generation to preserve and promote Sanskrit learning. Professor Homersham Cox was not only a mathematician of very exceptional capacity and enthusiasm, but also brought an incisive mind to bear on all questions affecting this University. Professor Gardiner Brown did more than any of his time for advancing the study of history.

Nor must I omit mention of those who left their class rooms and laboratoreis at the call of the Empire and gave their lives in its great service.

WHAT EDUCATION HAD DONE.

Looking back over 28½ years, I see vast strides in the education of this Province. One great change is the extension of the hostel system which has done much already and assuredly will do more as an agency for forming charactar. If we compare India of today with European countries at a corresponding stage of development, we need not be ashamed of our achievements. England did not get facilities for compulsory education until 1870 and it took six years, until 1876, before education was made generally compulsory. For several years after that the teachers in elementary schools in England were largely illiterates. Secondary education in England is still unsatisfactory, although there has been great improvement in the last few years. True, our own educational ideals in India are still far from clear. Our educational machinery is in part worn out and rusty. But still it has accomplished much. Faulty and makeshift as it necessarily has bee our education has made modern India. It has purified the public services; it has increased the number of men who think; it has prepared the way for new ideas and larger conceptions of civicduty; it has opened new aveuues of employment: it will end, I trust, in the growth and the spread of impertal ideas. There are still great walls of ignorance to be battered down. There are many and great temples of education to be built up. There is a call for the highest service from the best of India's sons. But the embers have been sirred. The beginuings of a desire for free and compulsory education are manifest. Great hopes thrive and grow. In a short time we have fulfilled a long time. Sir Alfred Lyall and truly in his inaugural address: 'Whatever eise may be said of the English administration of India, no one can assert that in the matter of education the English have not been open-handed and unreservedly, almost and audaciously, liberal.' We have tried to give education to India on the basis of trust and common aspiration.

HUMANITIES AND SCIENCES.

No country is satisfied with its educational system. All are trying to improve it. We in this province, the Government and the people, are striving shoulder to shoulder to better things. It is mainly a question of finance, in other words, of matarial progress. For education and material progress go hand in hand. As education improves, so material prosperity advances: and with the advance of material prosperity funds become available to make education more efficient. The United States of America with a population one-third of that of India spend 160 million pounds sterling annually upon education. In India we cannot yet anticipate such an expenditure; but every sacrifice made for the cause of education will bear fruit a hundred fold in the years to come. Never forget that education breeds prosperity and prosperity breeds education.

None appreciates more than I do the value of a liberal eduation for its own sake. But we have to face things as they are. Every educational system rests on certain social order. The social order has changed and with this there must be a change of educational system. Even before the war new ideals of educational policy were in the air; and the war has changed the aspect of policy much as a stream of lava changes this country at the base of some great volcano, or a tidal wave changes some island in the Pacific Ocean. The war has broken up the despotism of the humanities and has installed a a federatian of the sciences and humanities. This is the great, the master change. For centuries education has, to use Macaulay's phrase, disdained to be useful. It must be usefnl now. And yet one may hope that the humanizing of science, the scientific use of the humanities will go on side by side. No mere materialistic education will ever satisfy India. Over and above us all towers the peak of sheer educational power, over us all is still cast the spell of the ideal.

Some of you will remmember how Sir Auckland Colvin preached the importance of science to this University, and how his arguments were then regarded as an insidious undermining of political aspiration. I have seen one of our public men attacking Government in those days for its designs on humanistic studies and of late attacking Government for its neglect of science in education. I welcome the change of view. I will do my best to help you to meet the new demand, to promote 'research and discovery and the application of knowledge for the improvement of mankind.'

In England the epoch-making report of Sir J. J. Thomson's committee has pealed the bells of a new era. On every side one hears the cry for more and more applied science. The day of the specialist has

dawned at last. Chemistry, as Sir Thomas Holland aptly said, is the foundation of all modern civilized activities. India's great need to-day is the application of chemistry to agriculture and industry.

REFORM OF UNIVERSITIES.

The question of university reform will soon come upon us. The policy of the Government of India has been to restrict the area under which the affiliating universities have control by securing, in the first instance, a separate university for each of the leading provinces of India, and secondly, to create new local teaching and residential universities in each of the provinces in harmony with the best modern opinions as to the right road to educational efficiency. We have already a new university in the province, the Benares Hindu University. It is not a provincial institution, but it serves a larger number of our people. Considerable funds have been collected for a Muslim University at Aligrah. May I, as an old friend of Aligrah, who had the honour of knowing Sir Saiyad Ahmed Khan and was an intimate friend of Mr. Justice Mahmud, Nawab Mohsin-ul-Mulk, Nawab Viqar-ul-Mulk and others, appeal to my Muslim friends, who have done so well under trying conditions during the war, to close up ranks and work together for their sons and companions' sake in order that they may play their proper part in the educational development of the provinces. I contemplate the creation of new universities at Lucknow and later on at Agra. I shall appoint a committee to consider the establishment of these new universities as soon as the report of Dr. Sadler's committee is published. Great distinction must be drawn between the conditions that prevail in Calcutta and the conditions that prevail here, but I hope that we shall large much from the report of that committee. We must also try to develop a teaching university in Allahabad. This will involve the separation of what may be called the internal and external branches of the university, There are rumours that Dr. Sadler's committee will make important proposals in this connection. It has long been my own view that all work above the standard of Bachelorship in arts and science should be university work concentrated at the university centre and directed entirely by the university. It was an objection to this view that it would lower the standard of collegiate study and so lead eventually to a lowering of the college professorial staff. This argument will be met in the future by increasing the number of local teaching universities. The province lends itself extraordinarly well geographically to a rearrangement of this kind. In any case the view advocated resembles the line of advance in the West. Sir J. J. Thomson's committee is clear on the point. In America distinction is already drawn between the disciplinary education of the college and free-ranging education of the university. This, according to one American authority, is 'the most characteristic fact in the history of higher education during the past quarter of a century.' 'The college,' he continued, 'has for its object the important work of training students for the duties of citizenship, not primarily the duties of scholarship.' Another eminent American authority has outlined his idea of a university. The success of the higher work, he says, depends upon the intellectual and moral qualities of the professors, their freedom from all pecuniary anxiety, the widest publicity for their work and that of their assistants and students, and the steady improvement of libraries and laboratories.

A CHAIR OF GEOGRAPHY.

Under such a system pure research as distinct from applied research will be concentrated in the university. If we are to redeem our inferiority in the eyes of the educational world we must start research in very department to knowledge. 'Science,' said Sir Thomas Holland the other day, 'is not the monopoly of Europe, but we must do more than transplant the results, if it is to grow in India. We must undertake our ows research work here.' Chairs of research have already been founded in this University in history and economics and the work done has been most satisfactory. But the scope is pitifully small. The whole prestige of Indian university education suffers from its relative barrenness in the matter of research. Outside the universities research has been pushed forward, at the Tata Institute Pusa and other agricultural college, Dehra Dun and elsewhere. In the region of medical and sanitary science the work of Leonard Rogers, Liston and many others has been second to non in the world. The annual reports of the Board of Scientific Advice in India, the agricultural, geological and forest journals, journal of Indian medical research and other scientific journals afford encouraging reading. But the universities have not led the way. We must multiply chairs. We must appeal to those who are wealthy to endow them. I entirely agree with all that Sir Leonard Rogers said on this subject the other day. My Government will be ready to help you in this vital matter. I make you one advance offer this afternoon. We are singularly deficient in the teaching of geography. Geography is now one of the great sciences. 'The forms of the land,' said Sir Achibald Geikie, 'and their origin, the climates of the globe, the distribution of plants and animals and the causes that have regulated it, the influence of the variations of climate, soil and topography upon the history of man, the reaction of man upon nature:—these and a thousand other connected problems form

the subject of the highest kind of geography. Such a theme invested with so much human interest possesses a peculiar value in education.' To which we may add its eassential and transcendant value for the industrial advance of India, and her political incorporation in the British Empire. I am prepared to finance a chair of geography if you will secure from Europe a really trained geographer to inaugurate this new and fruitful course of study. Germany, France and Italy recognize the importance of this subject. In Italy alone there are twelve chairs of of geography.

The science of geography is one of the main subjects of any course of commercial education. Except in the Universities of London and Birmingham, commercial education has not secured much support in England. But it has gone far in America and on the continent of Europe, and it must play a large part in the reconstruction of the world that we trust will follow the declaration of peace. In this University we have faculty of commerce which is capable of development. I do not say that this is present one of the most urgent and needed reforms of education in India. But if good results are to follow the recommendations of the Industrial Commission the importance of commercial education will soon be felt throughout India. In this connection let me quote to you the opinion of Profesor Karl Pearson who devoted much attention to this branch of education: 'What is needed from the national stand-point is at most two or three perfectly efficient, fully manned, and fully equipped commercial universities attracting students from the whole area of the Empire. It is not a mere professor of commerce that is required, but ultimately a staff of ten or a dozen such professors, with a large auxiliary force of lecturers and assistants...... 'A fundamental rule of the commercial university ought to be the "third free year" of the Russian academic system, and this means that only two thirds of the senior staff will at any given time be actually engaged in teaching. The "third free year" is only free from teaching work, the lecturer is expected to travel for the purposes of research. Especially, owing to the rapidly altering, ever contracting and developing, processes of commerce will it be needful for the teacher to keep in touch with current progress and method. Nor can a man rear men to be pioneers unless he has done pioneering work himself.'

We must now enquire whether our libraries are sufficiently up to date and our laboratories sufficiently equipped for purposes of research. You will be interested to learn that we have asked the Government of India for a scientist capable of organizing the technological institute at Cawnpore for which the province has been waiting so long.

Our Senate has introduced a rule that speeches should be limited to ten minutes. Admirable rule, an example to all, disregarded by me, alas! this afternoon. My excuse is the magnitude and the difficulties of my theme. If I urge strongly the claims of scientific and practical education, it is because the times require them. Many minds must meet upon this problem before we can hammer out a scheme. Only three things I beg of you, first, let us, as far as possible, keep racial feeling out of education. Secondly, let us not be afraid of change and new ideas. Thirdly, let us face the future with big hopes and large schemes. It is not a time for timed compromise, or halting advance. A new world is in the making, which some of us will scarcely live to enjoy. You of the younger generation, who have received your degrees this, I hope, will live to see the great transformation. On your efforts the future of your country will depend. Cultivate enthusiasm. Go out into every corner of the province as missionaries of education. It is the highest service that you can render to your generation. The struggle may be long and arduous but the reward will be great. For you will bring prosperity and health, well-being and all the blessing to generations of your own people that material and moral progress carries in its train.

AGRICULTURE.

Mysore Amrut Mahal Department.

The following is an extract from the Mysore Government review on the Report of the Amrut Mahal Department for 1917-1918:—

Notwithstanding the scarcity of pasture and the breaking out of epizootic diseases such as Black-quarter and Rinderpest, the total mortality among the Amrut Mahal cattle was only 791 as against 885 in the previous year.

The precentage of birth-rate for the year was 40·51 as against 41·24 in the previous year; and that of the death-rate fell from 10·75 in 1916-17 to 9·26 in the year under review. The fall in the birth-rate is attributed to unseasonable rainfall, its unequal distribution and the want of pasture in summer. As observed by the Chief Commandant, the brith-rate might be improved by the supply of good breeding bulls to the several herds. This requires early attention.

With a view to improve pasture the Superitendent proposes to grow (1) Rhodes grass, (2) Guinea grass, (3) Elephant grass and (4) Mauritius water grass, in

selected localities. The result of the experiment will be awaited with interest.

The demand for the year amounted Rs. 57,907-2-7 as against Rs. 41,221-1-8 in the previous year, while the expenditure fell from Rs. 35,049-8-6 in 1916-17 to Rs. 26,853-8-6 during 1917-18, the decrease being mainly due to the savings effected in the pay of the Superintendent, Amrut Mahal Department,

One ram of the Australian flock is reported to have been given to a raiyat for breeding purposes and the number at the close of the year was 217. It is satisfactory to note that the Bangalore Woollen, Cotton and Silk Mills Company to whom samples of fleece were sent have pronounced them to be of good quality and to be free from kemp.

AGRICULTURE IN MADRAS

We take the following extracts from the Report on the Administration of the Madras Presidency for the year 1917-18:—

AGRICULTURE.

A season, favourable so far as the total quantity of rainfall went, was considerably marred by unepual distributions in the monsoons: breaks occurred at abnormal periods, and the usual break between the mosoons was practically, and in some districts entirely, unmarked. In spite of these seasonal disadvantages, however, the Agricultural Department were able to carry through their programme of experimental work almost unhindered, and the advance made in this sphere of activity is striking not less in kind than in degree. The measures recently undertaken in Egypt have been imitated in India, and the gratifying result has been attained that, in the Tinnevelly district, the main cotton growing area of the Presidency, *Pulichai* cotton has been almost entirly eradicated, and the substitution of pure improved strains for the country mixture has been accomplished. The experimental work on paddy cultivation has assumed a definate shape and it is believed that the value of the Presidency crop can in time, as a result of these most important investigations, be increased by 20 per cent, or by no less a sum than twelve crores. Scientific work on the cocoanut has been inaugurated and a start has been made with apiculture. The projected scheme under which, in certain areas, the agricultural and co-operative credit departments will work in joint harness should produce a beneficial effect.

A shortage of labour impeded the activities of the Horticultural branch, but the experimental work carried out on medicinal plants is in itself of considerable value. On the other hand, one of the most prominent and satisfactory features of the period under review is the record year—in every sense—of the Government Cinchona Factory at Niduvattam, which supplied no less than 20,000 lb. of quinine for the armies in East Africa and Mesopotamia and worked during the year at a profit of Rs. 7½ lakhs, or nearly double the annual expenditure.

FORESTS.

The policy of abandoning small isolated reserves and couverting all valuable reserved lands into reserved forest was continued and some progress, though not a great deal, was made with the forest panchayat system. In common with all other departments the Forest Department suffered serious dislocation from the absence of its officer on military duty: in addition to this war services of the departmrnt were codsiderable. The marketing of tanning stuffs was handed over to the Munitions Board and the department was thereby involved in a loss of revenue approximating to Rs. 300,000 which may be regarded as a a portion of the Presidency's financial contribution to the war. Tanning barks and hay as well as timber were supplied to the Military Departments in considerable quantity and the financial results of the year exhibited a notable profit.

TRADE.

The total value of the sea-bourne trade of the presidency, which approched five thousand lakhs, showed a decrease, as against last year's figures, of five hnndred lakhs; Government transactions were, however very high on account of the purchase of tanned hides for the War Office. The general effect of the war was, as might be expected, to increase the British Empire's share in the Presidency's trade. The export statistics for the Presidency port show the higest figure for fourteen years, the principal increases being in ores, groundnut, oilcake, and vegetable oils. There was, of course, a corresponding decrease in imports, the commodities involved being such as the stoppage of shipping facilities from Europe would most naturally affect. Abnormal quantities, however, of sugur, rice, raw hides and miteral oils entered the country. The depletion of steam tonnage and the various export and import ressrictions were a more serious blow to the smallports than ever, but led to an interesing revival in wooden ship-building for the coasting trade, which was increasing in volume toward the close of the year. In the absence of connexion with Europe, the exploitation of the Straits Settlements and Australian markets was markedly successful.

As regards internal trade, there were constant

complaints over the unavoidable shortage of rolling-stock and raw products formerly exported to Europe were seriously held up. The feature of the year—a feature with effects of a far-reaching nature—was the upward leap in the price of cotton, in sympathy with the rise in America. Rice rose steadilly in price throughout the year, and though actual producers and middlemen securred almost universal profits, there was considerable pressure on persons with fixed incomes. The improvement in registration noticed in the previous year was not maintained.

INDUSTRIES.

Spinning and weaving concerns were fully employed throughout the year—pricipally in meeting the orders of the Military authorities; the tanning and leather industries similarly enjoyed a period of exceptional prosperity, and the coir industries of the West Coast, at first adversely affected, recovered owing to the placing of large orders for coir screening for camouflage purposes in France. Rice factories, however,—specially in the northern districts—were hard hit by the shortage of rolling-stock and many were forced to close down. Factory sanitation made a marked advice, but with factories working intermittently or not at all there was no regular demand for factory lobour, and factory wages as compared with those outside, ruled low. In such a year the Department of Industries had of necessity numerous obstacles with which to contend; the shortage of rolling-stock, the scarcity of tannage of all classes, the anxiety as to the supply of coal, and most of all the increasing extent of Government control, all made against the progress of industrial enterprise. The Government Pencil Factory and the Government Soap Works increased their outturn and profits to a considerable degree; but the energies of the department were natually devoted mainly to war effort and war production, and in such a year the development of indigenous industries other than those of miltary utility was unavoidably somewhat shelved. A second exhibition of Indian arts and industries, opened by His Excellency the Viceroy in December at Madras, attracted a very large number of exhibits, brought in a notable contribution to the War Fund, and, as emphasized in His Excellency's opening speech, vindicated by its existence the policy of industrial development pursued patiently, though without encouragement, by this Government for a couple of decades.

CO-OPERATIVE SOCIETIES.

The outstanding features of the year's working were the activities shown by agricultural societies and unions in the way of joint purchase and sale the opening of new societies more especially among the weavers and fishermen, and the expansion and development of supervision by local unions. No great headway was made with the attempt to convert the Provincial Bank into a genuine federation, but its progress was otherwise satisfactory. New central Banks were registered and made e satisfactory start upon their carrers. The improvement in collection by agricultufal societies previously noticed was maintained during the year, but the arrears still remain heavy. A movement was made to bring the Co-operative Credit Department more closely into touch with the Department of Industries and to define the functions of these two departments and the lines along which their joint efforts might most profitably be dirceted. It is gratifying to record that the attitude of the general public was cordial and helpful throughout.

EDUCATION.

The System of Education in Australia.

At a recent Meeting of the Madras Teachers' Guild with Mr. Arthur Davies, M.A., Bar-at-Law, in the chair, the Rev. A. Jeffery, M.A., delivered an interesting and instructive lecture on 'The system of Education in Australia.' During the course of the lecture, Mr. Jeffery said:—There were three grades in the Educational System of Australia—Primary, Secondary and University. Primary education was free and compulsory. Children, both male and female, were sent to school when they were 4½ years old and all children were compelled to attend school between their sixth and fourteenth years. A large number of Inspectors were appointed to enforce the matter; parents were heavily fined for not sending children to school. All schools were built by the Government, every child being provided with a school within three miles of its residence. In some parts where the population was sparse, there were half-time schools. Generally each school had its own masters or mistresses—all teachers being trained by the Government. In the Primary School, a boy was prepared for life and nature study was particularly attended to. On the model of the Japanese system, there were higher Elementary Schools started to fill up the gap between the highest class in the Primary School and the first grade of Secondary Schools. Some pupils went to Secondary Schools merely for an extra course. The majority of pupils attending Government Secondary Schools prepared themselves later for the teaching profession. In country centres there were Agricultural High Schools training pupils for agricultural work; and in them were taught biology, geology and such other sciences, pupils being taught the best

ıethods of ploughing, rearing cattle, etc. The ɔunterpart of agricultural schools in city centres ʼas technical schools that were located in big buildıgs. Carpentry, engineering and other sorts of ıdustrial work were taught in these techuical :hools. In addition to Government Secondary chools there were privately-owned schools, which ad to subject themselves to Government inspection ıd control. In Victoria there were six public :hools--all privately-owned and established on a :ligious foundation. These public schools were ractically equivalent to the public schools of Engınd; there was cultivated in them an *esprit de ɔrps* which could not be found in Government :hools. Every pupil in a public school was forced ı take part in some out-door game and the manly ualities were consequently developed. The Univerty was largely independent of the Government and ɔuld not bo dictated to by the Government regardıg the appointments of professors. The executive ɔdy of the University was the University Council ɔnsisting of 23 members—3 from the professional aff, 3 from the Parliament, and the rest elected by ıe graduates. There was also the Professorial oard whick consisted of all professors and lecturers ı advise the Council regarding questions about ıaching and to attend to the discipline of students. he University system in Australia was different om that at Madras; the Australian University was teaching body, while the Madras university was ırgely an examining body. The University Colleges ere residential and contained big lecture-halls, useums and laboratories. The University was a ıge compound containing all the Univerity buildings. At the end of the Secondary School course, a stuent knew what career he had to take up. Medical udents were trained in Hosptials also, law students ere trained in Law Courts in the fourth year, :ience schools had their own laboratories for prac:al work, Engineering schools had scope for ʼactical work and veterinary schools had places set ɔart for the treatment of cattle. The University ıd a large number of students' societies relating to story, law, medicine, etc.; there was more talk the faw society tban in all the other societies put gether. The executive of the Students' Represen.tive Council had a voice in the meetings of the rofessorial Board. In the Residential Colleges ıere were a number of tutors for the different facues to give extra help and extra instruction. There as a Goverument scheme of scholarpips and exhitions by the aid of which deserving students were ıle to obtain their education almost free right rough to the end of their Uuiversity course. Public hools and certain colleges offered scholarships of ıeir own.

Along with institutions for general education there was the Working Men's College, in which young meu engaged in active business might receive education in the evening for a small fee; there was also the School of Domestic Economy for girls. There were Agricultural Colleges in addition to Agricultural Schools. Mining was taught in mining towus. Business Colleges had been opened for business training; but the fees were extraordinarily high. As regards examinations there was an attempt to introduce a new system by which each Principal should give his own certificate and the University should accept it in place of the Matriculation examination. It was not good to dispense with the Practical examaination completely in medicine and scientific subjects.

At the end of the lecture, the Chairman suggested that the lecturer might answer any questions put to him on the subject. During the course of the answers, the lecturer said:—Specialisation as it existed at Madras, was unknown in Australia. In Agricultnral and Technical Schools pupils had to pay along with ordinary fees special fees for practical work. In private schools the fees were considerably high. A Government scholarship covered only the ordinary fees of a studeut. The fees in the University varied according to the subject taken up. The salary of a Professor ranged from £800 a year up to £1,500 a year. A student entering the Uuiversity must be at least 16 years old. In State schools boys as well as girls were admitted and there was practically an equal number of them. As for private schools there were separate boys' schools and girls' schools. In the History and Law societies in the University, there were violent debates about political questions; but the Professors could not take part in politics. There was no representative for the University in the Parliament. Religious or moral instruction was not and could not be given in Government schools.

In his concluding speech the Chairman said that religious education in Australia and the question wby *esprit de corps* was not found in Government schools, might from the subject-matter for other lectures. The Madras University was modelled on tbe London University. The Australian University was only a glorified college calling itself a University; it was one unit. In Oxford each college had its own unity: there was rivalry among the different colleges; and the University as a whole was different from the colleges: the University life consisted in the competition among the diffreut colleges. The Madras University had been attempting to make itself more than an examining body. Our model for the Madras University should be the Oxford University rather than the Australian.

BANKING.

Mysore Bank's Progress.

Presiding at the sixth ordinary General Meeting of the shareholders of the Bank of Mysore, Ltd., Bangalore, on February 5th, Rajasabhabhushana Diwan Bahadur K. P. Puttanna Chetty, C.I.E., reviewed the Bank's progress during the past five years in an interesting speech. The following are extracts from it:—

Once again I have the pleasure to welcome you to this, our sixth Annual General Meeting, and I am sure I will only be giving expression to the thoughts uppermost in all our minds when I state that we assemble to-day in circumstances very different from those we have gone through for the past four years, and all are full of thankfulness that the most terrible war that has scourged mankind has been brought to so successful a termination, by the defeat of our barbarous enemies and the complete vindication of the principles of justice and freedom for which our Empire and our gallant Allies drew the sword. Our gratitude wholeheartedly goes out to the Empire's brave men who gave, and those who have risked, their lives and secured for us this triumphant issue. You would also, I am sure, like me to express our sympathy with the relations of those who went forth from this State and have made the supreme sacrifice on the field of battle. Their noble example will be enshrined in our hearts, for they have set us an ideal of true devotion and patriotism to our country.

SIR M. VISVESVARAYA, K.C.I.E.

Before I deal with business matters on behalf of the bank, I would like to tender to Sir M. Visvesvaraya, K.C.I.E, our most sincere and grateful thanks for the constant sympathy and practical assistance he has at all times readily given us. To his foresight and keen perception of the wants of the people, coupled with H. H. the Maharaja's solicitude for the welfare and property of the State, do we owe the establishment of this Bank, and, if anything has cheered and kept alive his intense energies for the development of the Industries of this State, it has been the splendid success which this first venture of his Government has met with. We propose in due course to adorn the walls of our proposed new building with a life-size painting of Sir M. Visvesvaraya, and I am certain you will all heartily support the proposal. You will, no doubt, also like me to tender our congratulations to Raja[illegible] Sirdar M. Kantaraja Urs, C.S.I., on his appointment to the Dewanship of the State. I am sure that we will continue to receive from him and Mr. A. R. Banerji, C.I.E. the officiating Dewan, the same sympathy and assistance which we have hitherto received.

STRONG FINANCIAL POSITION OF BANK.

Turning now to the business immediately before us, it is a great pleasure to me and to my colleagues to lay before you the accounts for the half-year ended 1918, which, I think, will satisfy the most exacting of the shareholders. The Balance Sheet exhibits the strong financial position of the Bank and expansion in the right direction. The figures in the Balance Sheet, close upon a crore of rupees, represent the growth of the bank during the short period of the five years it has been in existence, and with the position disclosed we have abundant cause for satisfaction.

OBJECT OF ESTABLISHMENT OF BANK FULFILLED.

If I am not wearying you too much, I think you would like to know, after our five years' working, how far we have fulfilled the objects for which the Bank was established, *viz.*, the financing of local trades and development of industries and commerce. To begin with, you will observe, from the figures of loans, cash credits and bills discounted, that over 61 lakhs are outstanding on the 31st December, 1918. The whole of this sum represents advances within the State. During the past five years our total advances of all kinds have exceeded 80½ crores, and our cash turn over 61 crores. These are large figures indeed for a young Bank of but five years standing, but they clearly exhibit the extent to which we have assisted our merchants and the necessity that existed for a Bank like ours. That the Bank has been able to put through transactions of so great a volume testifies to the ability, care and resourcefulness with which the affairs of the Bank have been managed during the difficult times we have passed through.

RESULTS FOR QUINQUENNIAM.

The result of our working for the quinquenniam has been a profit of Rs. 11 lakhs of which sum 43 per cent has been distributed to shareholders, 54 per cent put to reserves and the remainder to writing down our investments and annual bonus to staff, &c. Our constituents, besides the 1,300 shareholders, now number over 5,000. I trust this brief survey of our work will convince you of the safety of your investment in the Bank.

DEMAND FOR SHARES OF BANK.

There is a demand for our shares at Rs. 80 for the Rs. 50 share paid up, and I see no reason why

they should not appreciate still further. I would here like to make the suggestion to shareholders to first ascertain from the manager the market value of their shares before disposing of their holdings privately.

PROSPEROUS CONDITION OF THE COTTON CULTIVATOR.

At our last meeting I referred to the extremely prosperous condition of the cotton cultivators in the State—a prosperity which has been enhanced by the still higher prices which their raw product realized during the year, reaching a maximum of Rs. 560 per candy in September, with a minimum of Rs. 365, but I believe with practically little business passing at the lower figure, which was touched only in the latter months of the year when the depression in the Bombay cotton market was at its height. The out-turn of the crop totalled over 40,000 bales of 400 lbs., the same as in the previous year with an average price for the year of Rs. 398 per bale for mungari and Rs. 420 for compts. Owing to bad seasonal conditions the out-turn of the new crop is expected to be about 62 per cent of last year's (*i.e.*) about 25,000 bales. The unusual prolongation of the local cotton business, well into the second half of the year, helped to employ our funds profitably.

LARGE TRADE IN PIECEGOODS AND YARNS.

Our merchants have conducted a very large business in yarns and piece-goods, and very high prices were touched at the height of the made speculation in August and September, after which date the inevitable reaction set in. I am pleased to say that the condition of the local piece-goods market has since considerably improved and weak holders have been eliminated. Also, the mofussil demand during the past six weeks has been satisfactory. The value of piece-goods and yarns imported last year into Bangalore City alone amounted to 88¾ lakhs rupees as against 60½ in 1917, and an average of Rs. 46 lakhs for the two previous years. The prevailing high prices during 1918 are partly accountable for the large increase in values but if we take the weight of cloth imported into the State I find that there is an increase of 28,000 mds. over 1917. In connection with our advances against piece-goods and raw cotton in the Back's custody, I can tell you that, after a careful examination by a special committee of the Board, they were found fully secured with good margins. In no case did we encourage speculation by making advances to parties recently started in business, but confined our loans to established firms who have always been our constituents. I will not weary you with the detail figures of exports and imports of the remaining commodities which I have been accustomed to mention in my annual review of the trade of the State, but it is satisfactory to observe, in spite of increased railway restrictions and poor seasonal conditions, that the trade of the State during 1918 in these particular commodities shows no falling off, but rather an increase in volume of 627 lakhs of railway maunds over 1917.

INCREASE OF DIVIDEND.

We celebarate our fifth anniversary by declaring a 10 per cent dividend per annum for the half-year just closed making 9 per cent for the whole year—an important stage in our progress from which we confidently hope there will be no falling back. And gentlemen, it cannot be said that the payment of so satisfactory a dividend has been made at the expense of our Reserve Fund. We have always had before us the creation of strong and liquid reserves, and I think there will be few to criticize our action in having brought our reserve fund up to 42 per cent of our paid-up Capital within five years. For 1918 we have placed out of our net earnings Rs. 1,45,000 to the Reserve Fund, and this represents about 64 per cent of our net profits. For each of the two previous years we put aside a lakh, so that you see there has been no attempt to increase our dividend at the expense of a smaller allocation to the Reserve Fund.

SECURITY OF ADVANCES—OUR PARAMOUNT CONSIDERATION.

The safety of our advances and the strengthening of the Bank's financial position have always been, and will continue to be, our paramount consideration. Now, if you will refer to the figures on the liability side of the balance sheet, you will observe that our working resources almost touch a crore of rupees, a figure which I am happy to state has since been passed.

LARGE DEPOSITS FROM THE PUBLIC.

Our Fixed Deposits aggregate 57 lakhs and floating account 25½ lakhs, in which latter total I do not wish you to imagine that Government balances form any considerable proportion. These figures represent the splendid support we enjoy from the public, to whom we tender our best thanks, and anything we can do to still further increase the usefulness of the Bank we will be most pleased to consider.

SPECIAL CONCESSION TO CONSTITUENTS.

While on this subject, I may mention that we contemplate in the case of fixed deposits for one year to play interest quarterly, whenever such a course is demanded at the time of deposit.

STRONG CASH AND INVESTMENT POSITION.

To revert to the Balance Sheet, on the Asset side cash on hand amounting to 24¾ lakhs represents 96

per cent of our demand liabilities and combined with our investments, aggregatting 11⅓ lakhs and which are of the most liquid nature, being short deposits in the Presidency and Exchange Banks and 5 and 5½ per cent Government of India War Bonds, we exhibit a degree of financial strength second to no Bank in India, *viz*, a parcentage of 44 per cent to liabilities of all kinds, and if we exclude the Government deposit of 10 lakhs which is not due for repayment till 1923, the percentage is raised to fifty.

ORIGINAL GOVERNMENT CONCESSIONS.

In cennection with the original concessions which the Government of His Highness the Maharaja were pleased to grant the Bank on its establishment in 1913, I should mention that the annual contribution of Rs. 10,000 per annum towards working expenses ceased last May 1918. and this yaar's profit of 2¼ lakhs is minus last year's proportionate contribution of Rs. 6,666. Another matter which I think you should be acquainted with is that the Government have not thought fit to continue the same rate of interest which they originally quoted us for their 5 lakhs deposit. This rate, after remaining at 3 per cent, up to 1916, was raised to 4 per cent for 1917 and again raised to 4½ per cent for 1918-19. This means that instead of paying Government Rs. 15,000 as 3 per cent interest on 5 lakhs we are now paying Rs. 22,500—an increase of no less than Rs. 7,500 annually. I mention these two particulars only to show that we are not the spoilt child of Government which some people imagine us to be, and that the results of the past year's profits are therefore in every way eminently satisfactcry.

SEASONAL OUTLOOK.

The future agricultural out-look is far from reassuring. Tanks are dry, and drinking water is scarce. Fodder has risen considerably in value and is difficult to obtain. The situation is a serious one, and the next rains will be awaited with the greatest anxiety.

STOPPAGE OF GRAIN TRADE.

During the greater part of the last quarter the free trade in rice, paddy, ragi and Jawaree was practically stopped owing to Government commandeering foodstuffs. I shall not here dwell on the necessity for this action of the Government and the fixing of low rates for local produce out of all relation to those prevailing outside the State. There is less objection to the restrictions imposed on exports from the State, but reatrictions to the extent of stopping the free movement of grain within the State have been productive of consequences which are worse than the original evil, and it is to be hoped that such action has not alarmed cultivators of foodstuffs into sowing other crops, not likely to be commandeered in the future, and which, also, have been more profitable than the cultivation of food grains. The restrictions of free internal movement have now to some extent been removed, but I still hear of merchants finding it difficult in import local rice and ragi into Bangalore.

SECOND WAR LOAN SUBSCRIPTIONS THROUGH THE BANK.

As you are aware the Government of India were again last year borrowers te an unlimited extent for financing the war, and were successful in realizing over 51 crores from their main issue, *i.e.*, exclusive of receitpts through the Post offices. In this state the total subscriptions touched 16⅓ lakhs, besides the 30 lakhs taken up by the Durbar. No less than 15½ lakhs of this total passed through the Bank representing 2,900 subscribers and it speaks well for the financial position of the applicants that, in spite of the most favourable concessions offered by our Bank, our advances this year, only touched 3½ lakhs as against 7½ lakhs in the previous year and of which latter amount Rs. 20,000 only now remains outstanding. I feel certain the circulation of Government securities to the extent of 20 lakhs in this state within 2 years cannot but result in a better appreciation by the public of the advantage of a safe and readily negtiable investment.

INDUSPRIAL COMMISSION REPORT.

Another event of considerable importance has been the issue of the report of the Indian Industrial Commission appointed to examine and report upon the possibilities of further industrial development in India. The recommendations of the Committee are of a most interesting, and what is more to the point, of a practical nature. There is not a single trade or industry that is not deeply concerned with the conclusions which the Committee have arrived at. As a Bank we are much interested in the recommendations submitted in Chapter XX on Industrial Finance especially those referred to in para 293. The proposal of rendering financial assistance in the form of a cash credit by Banks on the recommendation of the Director of Industries and Commerce and the guarantee of the Government of India has already been the subject of discussion between our Government and the Board and we have expressed our willingness to act in accordance with the recommendations of the Commission.

INTRODUCTION OF THE MYSORE PAPER CURRENCY (EMERGENCY) REGULATION.

Another important matter, and one that perhaps few of you are aware of, is the introduction of the Mysore Paper Currency (Emergency) Regulation No XI of 1918 making Government currency notes

as issued by the Government of India now legal tender in the State. The Government of India prohibition of the free movement of specie by rail in the State, except under a spectal license from the Accountant-General, is probably the reason for the introduction in 1919 of the Regulation, in question but while the position of Banks is greatly strengthened there is not likely to be any diminution of the difficulties I referred to in my speech last year in the encashment of currency notes, and it is desirable that the Durbar should come to some working agreement with the Government of India for the creation of a special currency reserve within the State to meet the requirements of the public and mercantile community. The continuances of the issue of the smaller notes while defensible as a war measure is in no way desirable. The experiment cannot be described as a success, and the withdrawal of these notes will, I am sure, result in a complete return of the public confidence which the larger issues enjoyed before the war and the return into circulation of a great portion of the 100 crores of new rupees minted during the war.

THE RETIRING DIRECTORS.

As stated in the Agenda for our meeting to-day shareholders are called upon to elect two Directors in the place of those who are retiring by rotation. Rao Bahadur Mr. B. P. Annaswamy Mudr. C.I.E., has expressed his intension to withdraw by reason of the heavy calls on his services in the Cantonment. He has been a Director of your Bank for the past five years, and been most regular in his attendance at our Board meetings. His wide experience has been freely placed at our disposal and, on behalf of my colleagues as well as the shareholders. I tender him our sincere thanks for his services and hope that he may be long started to continue the good work he is doing in the Civil and Military Station.

The other retiring Director is our well-known citizen Mr. B. K. Garudachar. He has been on the Board from the inception of the bank, and all I can say of his work on the Board is that he has proved himself invaluable to us. His knowledge and experience of affairs in the city is unique, and he cannot do better than re-elect him unanimously.

The position of a Director on the Board of a Bank is regarded as one of some distinction, and it is too much to expect a Director to canvass for the votes of shareholders with a view to secure his own reselection. There are only two candidates in the field and you have an easy task before you. The only other candidate offering himself for the vacant seat is Mr. Tubagere Nanjappa and for whose election the usual proposal will be submitted for your approval.

THANKS TO MANAGER AND STAFF.

Our Manager Mr. W. C. Rose has steered the Bank through the troublous times of war with a steady and firm hand, which was even more plainly discernable in the manner in which he conducted the affairs of the Bank in the recent cotton and piece goods crisis. But for his sound advice, always willingly given, many a speculator would not have fared so well. His profound knowledge of Indian Banking conditions, his devotion to the interests of the shareholders and above all his sympathy for the public have made an impression upon the Directors. The Bank staff and the Agents have worked well and given satisfaction.

Before I move the adoption of the Directors' Report and audited balance sheet for the six months ended 31st December 1918, I shall be pleased answer any questions and give any further information desired on the accounts now before you.

ADOPTION OF THE REPORT.

On the motion of the Chairman, only seconded by Mr. M. L. Vardhamaniah and unanimously carried, it was resolved :

"That the Report of the Directors and the statement of accounts of the Bank up to 31st December 1918 be adopted."

DIVIDENDS.

On the motion of Rao Bahadar Deshmukh Shama Rao, duly seconded by Mr. Ahmed Sait and unanimously carried, it was resolved :

"That the payment of a dividend at the rate of 10 per cent. for the half-year ended 31st December 1918. making an average of 9 per cent. for the whole year and the allocation of Rs. 70,000 to the Bank's Reserve Fund, bringing up the said Fund to Rs. 4,20,000 out of the net profits of the half year, be approved.".

STATISTICS.

World's Productions of Petroleum.

The following appears in the *Board of Trade Journal*.—The increasing demand for petroleum and its products, both in the United States and the world at large, is brought out in a compilation by the National City Bank of New York showing world production of petroleum and the share thereof by the United States from the earliest date of that industry down to 1917.

This compilation shows that the United States in 1917 produced 342,000,000 barrels of crude oil,

against 300,000,000 in 1916, 210,000,000 in 1910, and 64,000,000 in 1900, and that it now produces two-thirds of the oil of the world.

Of the world's output of crude petroleum, the United States supplied 66 per cent in 1916, against 64 per cent in 1910; 43 per cent in 1900, 60 per cent 1890, and 88 per cent in 1880.

The production of petroleum in 1916 is given at 461,000,000 barrels of 42 gallons each, against 427,000,000 barrels in 1915; 328,000,000 in 1910; 149,000,000 in 1900; 77,000,000 in 1890; 30,000,000 in 1880; 6,000,000 in 1870, and about a half a million barrels in 1860. The world production of 1917 is estimated at about 500,000,000 barrels.

PRODUCTION IN 1917.

The production of petroleum in the United States 1917 was larger than in any earlier year, exceeding that of 1916 by 42,000,000 barrels. The world production in 1916 was larger than in any earlier year, exceeding that of 1915 by 34,000,000 barrels. For 1917 there are no complete figures of world production owing to the absence of data on production in Russia and Roumania in that year. While presumably there was a large decline in production in Russia in 1917, the fact that the United States output increased about 40,000,000 barrels and that of Mexico increased 16,000,000 may made the total world production of 1917 about 500,000,000 barreis.

COMPARISON WITH RUSSIA.

The United States has been the world's largest producer of petroleum continuously since the development of the petroleum production, except in the period 1898-1901, in which Russian production slightly exceeded that of the United States, the product of the United States in 1898 being 55,000,000 barriels, Russia 62,000,000; in 1899, United States 57,000,000, Russia 66,000,000; in 1900, United States 64,000,000. Russia 76,000,000, and in 1901, United States 69,000,000, Russia 15,000,000.

Beginning with 1902, however, the product of the United States exceeded that of Russia by 8,000,000 bariels, and in 1914 it was nearly four times as mach as that of Russia—the 1914 figures of production being for the United States 266,000,000 barrels, against 67,000,000 bairels produced by Russia.

Russia's largest production in any one year was in 1901, 85,000,000 barrels, falling to 67,00,000 in 1914, while in the case of the United States, the produdt of 1901 was 69,000,000 barrels, having advanced meantime to 266,000,000 in 1914, 292,000,000 in 1915, and to 300,000,000 barrels in 1916 and 342,000,000 in 1917, the United States figures for recent years being those of "marketed product."

The United States' share of the world,s petroleum production was in 1860 98 per cent; in 1870 91 per cent; in 1880 88 per cent; in 1890 60 per cent; in 1900 43 per cent: and in 1910 64 per cent; and in 1916, 66 per cent, these figures being in very round terms.

WORLD'S PRINCIPAL PRODUCERS.

The worlds principal mineral oil producers and then output in 1916 were: United States, with a product of 300,000,000 barrels; Russia, 75,000,000; Mexico, 40,000,000; Rumiana, 1,000,000; Duch East Indies, 13,000,000, and India 8,000,000 barrels.

The principal production of the United States by States was, in 1916, California, 91,000,000 barrels. Oklahoma, 107,00,000; Illinois, 18,000,000; rexas, 28,000,000; Louis Louisiana, 15,000,000; West Virginia, 9,000,000; Odio, 8,000,000; and Pennsylvania, 6,000,000, the figures being in very round terms. The chief increase in 1917 occurred in the "Oklahoma-Kassas" district, which showed a gain of 32,000,000 out of the total gain of 42,000,000 barrels in the Uhited States in 1917.

The United States, despite the fact that she is by far the world's largest producer of petroleum, is becoming of late a considerable importer, the quantity of crude petroleum imported in the fical year 1915 being 652,000,000 gallons, in 1916. 871,000,000 and in 1917, 1,079,000,000, a very large proportion of this coming from Mexico and seeking a market in the United States because of her superior facilties for refining the crude product.

SERICULTURE.

Progress In Kashmir State.

We take the following extracts from the Annual Report on the Administration of the Jamma and Kashmir State for the year 1914-15, just published:—

The working of the department in Sambat 1971 was very seriously affected by the outbreak of War, which practically put an end to all sales, besides causing a great increase in freights and insurance rates. The European market was almost closed and efforts to increase sales in India did not meet with much success. It does not seem likely that the enquiries made from firms in Burma and Siam will lead to much business, but the steps taken with a view to making direct sales in the American market may possibly have important results.

SERICULTURE.

The quantity of seed distributed during the year was nearly the same as in Sambat 1970, viz.,

36,008½ oz., but the cocoon crop was rather below the average (36½ seers per oz., of seed) owing mainly to a spell of cold weather at the beginning of the rearing season, and afterwards the epidemic of cholera. The local seed again gave better results than that imported. It amounted to a considerable proportion of the whole, rather more than 10 per cent in the year under report, and the amount is being increased considerably this year. Silk rearing in Skardu again gave inferior results; the experiment is hardly worth continuing, but a few men wish to make a further trial and this will perhaps be arranged. Increase in the number of rearers from 47,501 to 48,936 shows that the competition for seed is getting keener every year. The new filatures to replace those destroyed by fire, were still under construction, and the outturn of the factory was, therefore, far less than in former years, cocoons reeled being 7,822 maunds 32 seers 2 chitaks or almost exactly one-quarter of the amount reeled in 1969, the last year of full working. It is satisfactory to note, however, that the decrease in cocoons reeled was accompanied by a marked increase in the outturn per maund of No. 1 silk (6 lbs. 13 oz. 9 dr. against 5-13$\frac{9}{16}$ in Sambat 1970) due chiefly to closer supervision of the reelers. The total outturn was 78,323 lbs. 10 oz. 11 dr. (53,596 lbs. 12 oz. 5 dr. No. 1 and 24,726 lbs. 14 oz. 6 dr. inferior) as compared with 168,828 lbs. 5 oz. 0 dr. (94,978 lbs. 1 oz. 0 dr. No. 1 and 73,850 lbs. 4 oz. 0 dr. inferior) in the preceding year. The completion of the new filatures has been delayed by the difficulty of deciding between steam and electricity for heating the basins: as the results of experiments carred on for some years past, it has been established beyond doubt that electric heating can be employed with success, and that it is in some respects superior to steam heating. The question which was thus narrowed down to one of comparative cost, has now been finally settled by the Darbar in favour of the former. The new filatures when completed, will be in many ways an improvement on the old ones. As already stated the market was entirely upset by the War, and the total sales amounted only to Rs. 1,86,791 against to Rs. 23,29,694 in Sambat 1970, but the latter was an expectionally high figure. The preliminary balance sheet shows a small profit of Rs. 3,329 on the year's working, a better result than for Sambat 1970, but a very poor one if comparion is made with the preceding years. This is due of course to the fire and the War.

JAMMU.

Silk rearing was extended to 12 of the 16 tehsils of the province. With approximately the same amount of seed, the number of rearers increased slightly and the outturn rose from 27 seers per maund in Sambat 1969 and 23 seers in Sambat 1970 to 29½ seers in Sambat 1971, the amount of cocoons being 3,002 maunds against 2,316 in the previous year. This is much the largest crop secured so far, the largest previously being 2,007 maunds in Sambat 1969. The Kashmiri *girdawars* continued to do useful work. The seed in this province was all imported, excluding a few ounces of local Kashmir seed which gave very poor results. The Director comments on the length of time between the despatch of seed from the Hibernation House at Batote and its receipt by the rearers, which seems to exceed even a fortnight in some cases and exceeds a week in most and he contrasts with this the care taken in Italy to avoid an hour's delay in transit. It is indeed remarkable that fairly good results can be obtained where the delay in distribution is so great, but this delay is due to the configuration and poor communications of the province and only admits of partial remedies, one of which is the construction of another hibernation house in the Rajouri hills. In this respect the Kashmir Department has a great advantage. The cocoons were taken over from the rearers at first only at two centres, Jammu and Batote, to which Bhimber was added not long ago. In the year under report four more centres were added to the list to meet the convenience of rearers. This step togather with the free but judicious use of the reward system and house building advances should go some way to make silk rearing more popular.

The filatures worked for 264 days against 282 days in Sambat 1970 and 294 in Sambat 1969, the decrease being due to several unavoidable closures for various reasons; and there was also a shortage of labour in the latter part of the year, the result being a fall in cocoons reeled from 10,039 to 6,691 maunds. The total outturn decreased from 16,336 lbs. 8½ oz. last year to 11,669 lbs. 5⅝ oz., owing, it is said, to the decrease in the number of basins (worked); but this does not account for the decrease in the outturn per maund of cocoons, which in No. I silk has fallen from 5 lbs. 5 oz. to 5 lbs. 1 oz. and this is not explained. As a result of his Italian experience, the Director has, however, been able to make some valuable improvements, *viz.*, introduction of what he calls *nim-gudar*, whereby everything that the cocoons can yield is secured, and the increase of *sarnakh* at the expense of the less valuable *gudar*. The Jammu Department like that of Kashmir, has suffered much from the War, important contracts for the purchase of silk and cocoons being repudiated by the purchasers. On such sales as were completed, the prices were satisfactory, in fact better than any previously obtained; but the total realized fell from Rs. 1,51,472 in Sambat 1970 to Rs. 64,336

in the year under report with a corresponding increase in the stock on hand.

The preliminary balance sheet shows a loss of Rs. 16,736 which is to be regretted, but the special circumstances of the year under report made a considerable loss inevitable. In view of the fact that sericulture in the Punjab (or at least in Gurdaspur) has been definitely pronounced to be a failure, and that the net result of the working of the Jammu Department to date is a loss of Rs. 94,499 it may seem rash to prophesy a successful feture for it, but considering that improvements in the working are being effected every year, it may be hoped that as the rearers become more experienced and the subordinate staff more fully realize the spirit in which their duties should be carried out the results will improve gradually and the department show a profit on its working when normal conditions are restored on the cessation of the War.

MULBERRY CULTURE.

The number of nurseries was the same as in the previous year, *viz*, 13, five in Kashmir and eight in Jammu. One of the latter was extended during the year by the inclusion of some additional land, but the proposal for the consolidation of the Lusdana Nursery in Kashmir was dropped, sancting withheld to the acquisition of land required for the purpose. Nursery work continued as usual. Nearly 10,000 trees were distributed in Jammu, but a large precentage is reported to have failed owing to the lack of interest on the part of Zamindars in mulberry planting. To overcome the difficulty, it is suggested that the system approved for Kashmir of plantation in blocks with paid *Malis* to look after the trees in their early stages should be given a trial. In Kashmir the number of trees transplanted was 14,000 approximately, all of which are reported to have survived. Of the total number (about 2 lacs) of trees planted in this province during the last 10 years (Sambat 1962 to 1971) the percentage of survivals is 65 in the Southern Division and 53 in the Northern Division—a somewhat poor result but not wholly unsatisfactory if all the circumstances are considered. The net income of the department from fines and sale of wood was approximately Rs. 5,700. As regards the work of the department in general, it is observed that the system of block plantation and paid *Malis* or guards seems to work well, on the other hand the interest of the Zamindars in multerry plantation has not yet been aroused and it is feared that the concessions announced some years ago with a view to stimulating it must be pronounced a failure. It is, however, stated that the notices to the effect that the amount of seed given to silk rearers will depend on their interest in mulberry planting, has had a marked effect. On the whole the department is doing useful work under considerable difficulties due to the apathy of the people.

THE SILK INDUSTRY IN INDIA.

Mr. Lefroy's Report.

The report on the enquiry into the silk industry in India which was undertaken by Mr. Maxwell Lefroy, Imperial Silk Specialist and Mr. Ecansorge, C. S., which began in December 1915 has now been published.—

After an exhaustive report they couclude that the diminution in silk production in India is mainly in that of Bengal and is due to (1) the increased production of Japan, (2) disease, (3) the increased value of other crops and (4) the inferiority of the Bengal worm. The silk crop of Bengal is now almost limited to areas in which silk is the most suitable crop with a better race which is now available with the existing resources in nurseries. The industry can be largely revived if the new, hybrid races are introduced and if a competent European officer is appointed to organize the introduction. The industry in Mysore and Kollegal is capable of extension on the same lines and its production of silk can be considerably increased if disease free seed of an improved (probably hybrid) race can be issued from a station situated in a suitable climate. The industry in Kashmir is in no need of any thing but local extension in regard to tree planting and the production of silk nearly at the limit of the existing tree. The question of developing seed supply must depend on the conclusions reached by the imperial agricultural bacteriologist on the pebrine question. The small industries in Assam and Burma are capable of considerable extension with better races of seed better plant. New areas for silk production are being tested. There is large scope for development in the Punjab the United Provinces and Bihar submontane tracts but this will require extensive organisation at the start and will develop slowly. Other areas for silk production are uncertain and can be tested only by continued experiment. The development of the industry depands primarily upon continued expert orgauization and a seed supply. With an expert organization and with a source of seed in India there can be a large extension in Bengal and Mysore, some extension in Assam and Burma, a steady growth probably in Northern India all likely areas in India can be tested. The ultimate limit of development is a perfectly definite one decided by climatic and economic conditions, the latter of which are not yet ascertained for all parts of India. But it is probable that a very large increase in production is possible and may be confidently looked for if competent organization is applied through ordinary channels. The expenditure involved is

mall and the lines of progress are definitely ascertained. The detailed minor improvements in each rea are indicated above. The broad requirement s the provision of an expert organizing staff and a entral seed-producing station. There has been a liminution in the Tasar industry due mainly to the ncreased value of food crops, partly to the better ontrol of forests and partly to the decreased denand for Tasar goods. The production of cocoons an be assisted only by a prolonged inveatigation nto the biology of the insect, the result of which nust be uncertain. The position of the Tasar prolucer is not sucb as to justify this investigation, and t is not worth undertaking. The closely related ndustry of Tasar weaving can be assisted probably only by the provision of organization in the disposal of fabrics, better methods and extension of co-operaive credit. The latter is the most vital, the Tasar vorker being very generally hopelessly indebted and inable to work under present conditions. The inlustry is a very scattered one and will be difficult to organize on that account, but it is very large and alls chiefly within a single province. Its production s not exported and the position of the industry is a natter wholly of local concern. No real effort to issist the industry has been made during the last forty years and there is probably good scope for development on co-operative lines. This could be easily done and the cost would be fully justified by the results.

The Muga and Eri industries are small and practically confined to Assam. They are capable of improvement with expert advice, but will, probably, never develop to large proportions. Eri might possibly become a large industry if the use of Indian raw materials was developed in England. The production of silk cocoons of all kinds and the disposal of the produce can be considerably developed by the provision chiefly of an expert organization similar to that of the agricultural departments in India and it is essential that this organization shall also be in close touch with the manufacturing part of the silk industry. The question of the utilization of silk and the development of the silk weaving industry is less simple that than of silk production. The decline in the export of manufactured silk, and the growth in the imports of manufactured silk or due to the continuance of defective methods in India, bad economic conditions, want of organization in India, and the increased cheap production (probably due to better organization of weaving) in Japan. The export of manufactured silk from India is unlikely to be considerable unless the industry can be organized and the existing methods improved. This will be possible only by such an extension of co-poerative credit among the weavers as will mak[illegible] independent of the employers who have prevented improvement and resisted organization and it will require a combination of expert advice, commercial organization and co-operative credit extension that will be extremely difficult to apply. It is uncertain if the Indian worker will ever be able to compete successfully and work for an export trade. It is more likely that the extension of weaving will be limited to meeting the internal demand except on such articles as require fine imported raw materials. The best deciding factor of this is the question of how Japan is able to produce silk fabrics cheaper than is now possible in India and it may be that it will ultimately be decided that it will be impossible ever to developing the export of manufactured silk. The inquiry into the production in Japan has yet to be made. It is certain that the Indian weaving industry suffers in competition with other countries in its defective methods, in the deplorable position of the workers, in the excessive profits made by the dealers and employers, in the lack of ordinary business organization and commercial enterprize. Defective methods cannot be remedied until the actual craftsman can be put in a position to adopt better ones and the Indian weaver can probably compete successfully if he can be properly financed organized and developed. To do this requires, first, the means for experimentally producing silk fabrics, secondaly, capital with which to finance the development and the production of better goods; thirdly, thorough local inquiry into the circumstancs of the weavers and the means of organizing them, and fourthly, a co-ordinating organizing staff whose operations can extend all over India and who can stimulate trade development provicially and outside India. In doing this it is essentile that the ordinary commercial methods are adopted and that considerable sums of money are risked until the production and sale can be taken over by commercial agency. The ordinary business of trading must be done by the State and some further experience is required to definitely ascertain in what areas better methods, proper economic conditons and good organization will enable the Indian weaver to successfully produce the articles now in demand.

Some area such as Burma, are far more promising than others and there is justification for the belief that if a real effort is made with sufficient capital, the greater part of silk required can be produced in India and that possibly an export trade can also be created. It is useless to ignore the difficulties. It is also certain that nothing but a real businesslike effort will achieve anything. The mere creation of the schools, institutes, etc., will do nothing. I will be easy to have large permanent staff and to really [illegible] unlikely that any solid

progress will be made during the first year or two. The best plan is to provide the organization and to attempt to reorganize the industry in suitable areas with a combination of local effort and central advice commencing on small lines in suitable places. The organization required for this is discussed and the creation of a central silk institute to work with provincial silk assistants is recommended. In the first place, this should be limited to the provision of a seed supply station in a suitable climate. The necessary staff for hybridizing for seed production and for the supervision of rearing experiments, should be provided and there should be an officer in the imperial service whose advices should be available to all provinces and states on the improvement, and development of silkworm cultivation. This having been provided, the development of weaving should be considered and the action that will be taken by local Governments will determine how for it will be necessary to provide the staff of the central silk institute suggested, also that the inqniry suggested suould be undertaken before any development is commenced. For the first year probably the expenditure in this direction will be small, but if provincial Governments generally agree to the proposals and the work commences to develop, the staff of the institute will be required and buildings and appliances will need to be provided for, including non-recurring expenditure and capital. The amount required annually during the first four years should not exceed Rs. 1,50,000; in recurriug expenditure it should not exceed Rs. 75,000 in the first year and rise to Rs. 1,50,000 in about four years. "I am assuming that nearly all provinces develop their silk industry and that the full scheme is worked up to. It is impossible to lay down rigidly what the development should be. Two things are absolutely essential. The first is that the officer responsible shall be give as much freedom as possible in deciding in what direction to make progress first and shall not have his budget too minutely sub-divided. The second is that it shall be recognized that progress will be slow and that it is useless to embark on any development at all unless it is likely to be persisted in for a period long enough to really test its value. If success is to be achieved its will require a steady effort maintained for more than one generation and during this time many methods will need to be tried and there will be some failures."

MYSORE ECONOMIC CONFERENCE

EDUCATION COMMITTEE.

Brief report of the work done during half year ending 31st December, 1918.

I. During the period under report, the following schemes chiefly engaged the attention of the Committee:—

1. Hostel accommodation for A. V. Schools.
2. Publication of a Ladies' and a Children's Magazines.
3. Popular Science Lectures.
4. A scheme of Physical Culture.
5. The subject of introducing industrial subjects into the S. S. L. C. course.
6. Development of the scheme of Public and Travelling Libraries.
7. A revised scheme for a Music school at Mysore.
8. Distribution of the scholarships to students of backward and depressed classes.
9. Reorganization of the Weaving Schools in the State.
10. Subjects of the Representative Assembly *re* free-studentships to the students of the Devanga and Mahomedan communities.
11. Opening an Industrial Teacher's class for girls in the Girls' High Schools, Bangalore.
12. Education of adult women by means of public lectures.
13. Scheme of popular lectures in the Taluks.
14. A new Physical Culture Class.
15. Scholarships for Malnad boys.

II. Experimental Work.

(1) LIBRARIES.

(a) Public Libraries of Bangalore and of Mysore.

(a) *The Bangalore Public Library.*—Arrangements have been made to open a Ladies' and Juvenile section, to appoint a qualified Librarian and to utilise the *whole* of the Seshadri Memorial Hall for the purposes of the Library. The books have been classified according to the Dewey Decimal system, and the new catalogue embodying the necessary changes is in Press. An audit of the accounts of the Library was ordered.

(b) *The Mysore Public Library.*—The appointment of a graduate Librarian to the Library is recommended. A Ladies' and Juvenile section has been opened and is becoming popular.

(b) Rural Libraries.

There was no progress under the Rural Library Scheme since no grants were sanctioned for these Libraries owing to the non-receipt, from the Deputy Commissioner Presidents, of the requisite periodical reports and returns.

People in rural areas have been enthusiastic in coming forward with contributions for founding and developing Libraries in villages. The Committee have accordingly recommended grants to the Libraries in the Districts of Hassan, Kolar and Kadur. A revised and enlarged catalogue of Kannada books and periodicals approved for the nse of these Libraries was issued (1918).

(c) Taluk and District Libraries.

The Committee sanctioned grants to the Taluk Libraries of Arsikere, Belur and Hole-Narsipur.

(d) Travelling Libraries.

Every District Committee was provided with the necessary Travelling Library requisites, such as, sets of book-cases and of Kannada books, registers, copies of rules, forms, etc. Government were pleased to approve of the sale of Travelling Libraries to villages at half cost (G. O. No. 1730-40—Edn. 14-17-100, dated 20th August 1918).

Three Urdu Travelling Libraries have been formed for the benefit of the Mahomedan population of the state.

(2) HOME INDUSTRIES CLASSES.

Thirty-four new classes were opened during the half year bringing up the total to 131. A special Tailoring class was opened in the H. I. Institute, Bangalore. The audit report of the accounts of the Institute is being considered by a Sub-Committee. The Education Committee resolved at their meeting on 21st December 1918 that the Home Industries classes, one year old and the two Institutes at Bangalore and Mysore be handed over to the Education Department.

As the provision of Rs. 25,000 allotted for the Home Industries classes during 1918-19 was found insufficient an additional amount of Rs. 3,000 was reappropriated. The classes working in the Chitaldrug District were inspected by the Secretary in the month of September. The Home Industries Institute, Bangalore, registered 39 home workers during the period under report while the Mysore Institute registered 84; the sale proceeds realised from manufactured articles were Rs. 830-9-0 and Rs. 477, respectively.

The Institutes and the classes were awarded 21 medals, 17 certificates and 3 prizes.

The deputation of a lady to the Phillipine Islands to undergo special training in Home Industries was also resolved upon by the Committee and recommendations made to Government since the close of the half year.

(3) POPULAR SCIENCE LECTURES.

Regarding Popular Science lectures, the Kannada Popular Science Association having intimated that the lectures failed to attract sufficient audience, a note of suggestions was prepared by Dr. M. Srinivasa Rao and forwarded to the Association for adoption. Some further suggestions were made by the Science Education Sub-Committee.

(4) PHYSICAL CULTURE.

A physical Culture expert was appointed and a class started at Bangalore. Regular work was commenced in January.

(5) ADULT EDUCATION OF WOMEN.

Further details in regard to the Education of adult women by means of lectures and the revision of the scheme of backward classes scholarships are being worked out.

One meeting of ladies was held and interesting lectures were delivered by Srimati Srirangamma, B.A., and others.

III. Publications.

Seven publications were undertaken. Four compilations, one bulletin, one lecture, and one Quinquennial Summary (Part II.)

They are as follow :—

(1) Educational Statistics of Japan and Mysore, compared :
(2) Mysore Stndents Abroad ;
(3) Schools of Public life (a brief account of Assemblies and Committees in Mysore) ;
(4) Translation of 'careers and courses.'

(The first two are ready.)

(5) and (6) A Bulletin on plague and a lecture on Printing in Mysore were published.
(7) Quinquennial Summary (Part II) is nearly ready.

IV. Dasara Activities.

The work during the last Dasara was confined only to lectures on account of the Influenza epidemic. Only one lecture was delivered. Subject: Progress in Mysore after the Rendition.

V. Sub-Committees, their meetings and the Subjects discussed :—

1. *Industrial Education*: **2 Meetings.**

(a) Supply of Electrical appliances to the Home Industries Institute, Bangalore.
(b) Conversion of General Education Schools into Polytechnic Institutions.

(c) Introduction of compulsory Industrial insstruction in Lower Secondary Schools.

(d) Deputation of a lady to Phillipine Islands to study the Home Industries.

(e) Transfer of the management of Home Industries Institute at Bangalore and Mysore and such of the classes as are more than a year old to the Education Department.

(f) Additional grant of Rs. 3,000 for the Home Industries classes.

(g) Recommendation to Government that the Home Industries classes be run as Government Institutions.

2. *Library Sub-Committee*: **2 Meetings.**

(a) The Committee recommended grants to several Libraries at Chitaldrug, Arsikere Belur and Nelamangala and other places.

(b) Appointment of a Chairman for the Committee for the management of the Public Library, Mysore.

(c) Applications for the post of the Librarian at Bangalore and the appointment of a graduate Librarian for the Mysore Public Library, considered.

(d) The establishment, house rent, etc., for the ladies' and Juvenile section.

3. *Scholarship Sub-Committee*: **1 Meeting.**

(a) Developing Panchama Education.

A recommendation was made to Government regarding the further facilities to be provided.

The establishment of a boarding school at Mysore for Panchama girls is still before the Committee.

(b) The distribution of scholarships to students of backward and depressed classes.

4. *Female Education*: **2 Meetings.**

(a) Measures to be adopted for the encouragement of higher Education.

(b) Introducing industrial subject into girls' schools.

(c) Revising curricula of studies for girls' schools.

(d) Instituting a special faculty and special degrees for women.

(e) Boarding schools for girls.

5. *Miscellaneous Subject*: **1 meeting.**

(a) The question of granting special scholarships to malnad students receiving. Secondary higher and Professional Education is still before the Committee and some other subjects were also discussed.

(b) Recommended the encouragement to be given to the author of Samaja Dharmada Kaipidi.

6. *Science Education*: **1 meeting.**

The question of organising Kannada Popular lectures in Science made several new suggestions.

7. *Special Committees.*

Hostel Accommodation: One Meeting.
Mysore Annals: Three Meetings.
Boy Scouts: Two Meetings.
For selecting Economic Lectures: One Meeting.
Ladies' Magazine: One Meeting.

Summary.

No. of subjects discussed	63
No. of recommendations made to Government	40
No. of recommendations sanctioned by Government	20
No. of notes drawn up by members ...	11

V. SUBRAHMANYA IYER,
Secretary.

Brief Report of work in January.

I. Home Industries.—The Instructor of the Tailoring Classes in the Home Industries joined duty on 1st October 1918. But regular classes could not be held at once on account of influenza in the City. There are now 12 on the rolls. The continuance of the Instructor's services has been sanctioned till the end of February 1919. Fair progress has been made,

Recommendations were made to Government—

(a) For transferring all the Home Industries classes and of the Home Industries Institutes at Bangalore and Mysore to the Educational Department.

(b) For deputing B. Nanjamma to the Phillipines to study the methods of developing and organizing Home Industries there.

Applications were invited from qualified persons by notification in the Gazette, for the place of the Superintendent of the Home Industries Institute, Bangalore, temporary arrangements being made for the work of the Superintendent.

II. Physical Culture.—The Physical culture class sanctioned by Government was opened on the 2nd instant. There are at present over 100 pupils. The Inspector General of Police has sent 22 pupils

from the Police Training School and the Inspector General of Education 10 pupils from the Normal School, for training. About 90 pupils from other schools were selected. The class was being held in the premises of Police Training School at first. For want of sufficient accommodation, it has now been shifted to a rented building near the Fort.

III. City Economic Lectures.—Mr. H. K. Mallappa, the Economic Lecturer for Bangalore City, reverted to his appointment from his work in connection with war recruitment. He has since then delivered 3 lectures on 'Duties of women' and the 'Depressed classes, Employees and their Union' and 'Duties of men.' The Committee have recommended his appointment as Lecturer for both the Cities of Bangalore and Mysore.

IV. Libraries.—The appointment of a graduate Librarian for the Mysore Public Library and a graduate Librarian for the Bangalore Public Library as well as the continuance of the Ladies' and Juvenile section of the Mysore Library for a further period of 2 years were recommended to Government.

The appointment of Mr. N. S. Subba Rao as Chairman of the Committee for the Mysore Public Library and the appointment of Mr. B. M. Srikantaiya as the Officer in charge of the Library were also recommended to Government consequent on the resignation of Mr. Humza Hussain of the Chairmanship. This recommendation has since been sanctioned by Government.

V. Subrahmanya Iyer,
Secretary.

RECONSTRUCTION IN ENGLAND.

Reform in State Machinery.

The Report of the Machinery of Government Committee of the Ministry of Reconstruction has been issued as a Parliamentary Paper (Cd. 9230).

The Committee, which consisted of Lord Haldane (chairman), Mr. E. S. Montague, Sir Robert Morant, Sir George Murray, Sir Alan Sykes, Mr. J. H. Thomas, and Mrs. Sidney Webb, was appointed in July, 1917, "to inquire into the responsibilities of the various Departments of the Central Executive Government and to advise in what manner the exercise and distribution by the Government of its functions should be improved." The Report is signed by all the members of the Committee. It is divided into two parts, the first dealing with the general principles which the Committee suggest for adoption in Government, Departments generally, the second consisting of separate chapters illustrating the application of these principles to 10 of the main branches of the business of Government—namely, Finance, National Defence, External Affairs, Research, Production, Employment, Government Supplies, Education, Health, and Justice.

Before dealing with departmental organization the Report refers to the functions and procedure of the Cabinet. While it is agreed that its constitution and methods of procedure must depend on the circumstances of the time, the personality of the Prime Minister, and on the capacities of his Principal colleagues, the main functions of the Cabinet may, it is thought, be described as:—

(a) The final determination of the policy to be submitted to Parliament:

(b) The supreme control of the national executive in accordance with the policy prescribed by Parliament; and

(c) The continuous co-ordination and delimitation of the activities of the several Departments of State.

For the due performance of these functions the following conditions are considered to be desirable:—

(i) The Cabinet should be small in number—preferably 10, or at most 12:

(ii) It should meet frequently:

(iii) It should be supplied in the most convenient from with all the information and material necessary to enable it to arrive at expeditions decisions:

(iv) It should make a point of consulting personally all the Ministers whose work is likely to be effected by its decisions: and

(v) It should have a systematic method of securing that its decisions are effectually carried out by the several Departments concerned.

It is pointed out that during the war an briefly new type of Cabinet was evolved with the methods of procedure and the opinion is expressed that probably thd constitution and procedure of the War Calmit will not be found entirely suitable to peace conditions. A rearrangement of the supreme direction of the executive organization as it formerly existed has however, been recodered necessary, not merely by the war itself, but by the prospect after the war. Such a rearrangement has been attempted, and the question whether it has yet assumed an adequate from, or works as efficiently as it might, is quite a different question from whether it is possible to return to the old order of things. The latter question, the Committee feel must be answered in the negative. The Report continues:—

Whether the new type of Cabinet should contist of Ministers in charge of the principal Departments of State, or of Ministers "without portfolio" able to concentrate their whole attention upon the problems submitted for consideration, or of Ministers of both kinds, are questions which we do not propose to discuss here. But we think that there is one feature in the procedure of the War Cabinet which may well assume a permanent form namely, the appointment of a Secretary to the Cabinet charged

with the duty of collecting and putting into shape its agenda, of providing the information and material necessary for its deliberations, and drawing up records of the results for communication to the Departments concerned.

With regard to the formulation of policy, the Committee have come to the conclusion that in the sphere of civil Government the duty of investigation and thought, as preliminary to action, might with great advantage be more definitely recognized. It appears to them that adequate provision has not been made in the past for the organized acquisition of facts and information, and for the systematic application of thought, as preliminary to the settlement of policy and its subsequent administration. The principle ought by no means to be limited in its application to military and naval affairs. It will not be possible to apply these methods as fully in the sphere of civil Government, but they urge strongly.

(a) That in all departments better provision should be made for inquiry research and reflection before policy is defined and put into operation.

(b) That for some purposes the necessary research and inquiry should be carried out or supervised by a Department of Government specially charged with this duties but working in the closest collaboration with the administrative Departments concerned with its activities.

(c) That special attention should be paid to the methods of recruiting the personnel to be employed upon such work; and

(d) That in all Departments the higher officials in charge of administration should have more time to devote to this portion of their duties.

Attention is drawn to the importance of the work achieved by the organizaion set up during the war under the Privy Council to encourage the application of science to industry, and the extension is foreshadowed of this form of organization to cover other fields of research, notably that of medicine, in which a fine record of achievement already stands to the credit of the Medical Research Committee.

Distribution of Business.

The Committee discuss at length the question of adopting a definite principle on which to distribute business between the various Departments. They say:—

There appear to be only two alternatives, which may be briefly described as distribution according to the persons or classes to be delt with, and distribution according to the services to be performed. Under the former method each Minister will presides over a department would be responsible to Parliament for those activities of the Government which affect the sectional interests of particular classes of persens, and there might be, for example, a Ministry for Insured Persons, or a Ministry for the Unemployed. Now the inevitable outcome of this method of organization is a tendency of Lilliputian administration. It is impossible that the specialized service which each department has to render to the community can be of as high a standard when its work is at the same time limited to a particular class of persons, and extended to every variety of provision for them, as when the department concentrates itself on the provision of one particular service only, by whomsoever required, and looks beyond the interests of comparatively small classes.

The other method, and the one which we recommend for adoption, is that of defining the field of activity in the case of each department according to the particular service which it renders to the community as a whole. Thus a Ministry of Education would be concerned predominantly with the provision of education whereever, and by whomsover, needed. This method cannot, of course, be applied with absolute rigidity. But, notwithstanding necessary qualifications, we think that much would be gained if the distribution of depairmental duties were guided by a general principle, and we have come to the conclusion that distribution according to the nature of the service to be rendered to the community as a whole is the principle which is likely to lead to the minimum amount of confusion and overlapping.

The committee point out that in the case of services which are national in the sense (Navy, Army, Air Force, Post Office and in future, perhaps, always and ofter systems of transport), the efficiency of the service and the organisation of the personnal employed in it can only be secured by putting the responsibility both for the service and the persons in the hands of the same Minister as the head of the separate Department to which the enterprise as a whole is entrused. The Report also lays stress on the fact that final and waterright divisions of business between Departments cannot be made under the complex conditions of modern government. The principal of assigning business to Departments according to the nature of the service which they exist to render must therefore be rainforced, and if necessary qualified by increased co-operation between Departments and greater readiness to recognise that the structure of Government is a living organism and must be expected to develop new needs as it grows and progresses.

Departmental Co-Ordination.

In dealing with the vexed question of Departmental competition for given pieces of work, the Committee illustrate their point of view by nothing that "work which is of primary interest to one Department may well be within the province of that Department, even when some portion of it is also undertaken as a secondary interest by Departments devoted to other ends. If, as we suggest, there should be one Ministry of Education, of Health, and of Finance, in which functions relating primarily to those ends should in each case be concentrated, there must at the same time be within other Ministries, special branches devoted to educational, hygienic, or financial work, as secondary interests of the Ministries within which they lie. Yet neither the Ministries of the primary interests nor the branches dealing with the secondary interests can operate with full effect unless they are in close and constant touch with each other. Sometimes this communication will need to be so close that there will have to be standing joint bodies of the Departments concerned. Sometimes regular or informal communication on specific questions will suffice. But contact of some kind is vital if the service in question is not to languish in Departments in which it is secondary, and if the Department in which it is primary is to exercise full potentiality for making whatever contribution lies its power to the general maintenance of the highest possible standard in all

branches of the work upon which its main forces are concentrated.

In the third place the Committee recommend that, in "the organization of individual Departments, special importance should be attached to securing proper consideration of proposals for expenditure, unimpaired Ministerial responsibility, co-operation with advisory bodies in matters which bring Departments into contact with the public, and the extended employment of qualified women." In the last point Sir George Murray dissents from his colleagues pointing out that the whole question of the employment of women in the service of the Government is now being investigated by other official bodies, and recording his view that any definite conclusions on the subject must meanwhile be premature.

Fourthly, the Committee, in concluding the first part of their Report, emphasize the danger that a more efficient public service may expose the State to the evils of bureaucracy, unless the reality of Parliamentary control is so, enforced as to keep pace with any improvement in departmental methods." They allude in this connection to the importance of the recommendations of the recent Select Committee on National Expenditure, which aim at restoring and strengthening Parliamentary control over the country's finances and to an interesting suggestion that Parliament should maintain a continuous and informed survey of the activitres of Departments by means of a series of Committees of members, each watching a particular branch of affairs.

Divisions of Government Business.

If the principle that the business of the various departments should be distributed as far as possible according to the class of service with which they are concerned be accepted, the Committee consider that the business of Government would fall into one or other of the following main divisions:—

I.—Finance.
II and III.—National Defence and External Affairs,
IV.—Research and Information.
V.—Production (including Agriculture, Forestry and Fisheries), Transport and Commerce.
VI.—Employment.
VII.—Supplies.
VIII.—Education.
IX.—Health.
X.—Justice.

The Committee have considered whether the functions falling to the Board of Trade the Board of Agriculture and Fisheries, and, to a less extent, to several other departments can be best supervised by a single Ministry or by several Ministries all devoted in principle to the same end of increasing the productive capacity of private enterprise, and therefore associated with each other, whenever requisite, by some machinery of joint committees, though severally specializing in a distinct sphere. In the latter alternative separate Ministries might be responsible to Parliament for (a) commerce and industry; (b) agriculture and forestry; (c) fisheries; and possibly for other Government activities initiated by Parliament in relation to the matters mentioned.

Special interest attaches to chapters of the Second Part of the Report on Finance, Research, and Justice. In considering finance, the Committee recognize that the Treasury must remain the premier Department of State, and that responsibility for raising revenue cannot without peril be separated from control over expenditure. If the Chancellor of the Exchequer "is to be held responsible for filling the reservoir and maintaining a certain depth of water in it, he must also be in a position to regulate the outflow." But the Committee have substantial changes of spirit even more than of substance to recommend as regards the Treasury. They say:—

The information at our disposal suggests that if a new situation in this respect is to be brought about the obligation on spending departments to formulate a full and reasoned statement of their proposals must be recognized as placing on the Treasury a corresponding obligation not to assume a negative atitude in the first instance towards suggestions for improving the quality of a service of the efficiency of the staff which administers it.

Research and Informating.

The influence of business men and methods on Departmental views and practice may perhaps be traced in the further recommendation that "in the Treasury there should be a separate branch specializing in "establishment" work, and studying all questions of staff recruitment, classification, &c., and routin business generally." The description of the varied activities, of Departments in conducting special inquiries and prosecuting research contained in the chapter on Research and Information furnishes ample proof both of the importance of these questions and the haphazard way in which they have for the most part been handled until now. The Committee definitely recommend the extension of the Privy Council organization to other fields of research. They also set out in some detail the kind of way in which they think that authorities solely devoted to research should share with administrative Departments the search for a solution of particular problems.

Much has been heard lately of proposals to set up a Ministry of Justice. The Committee devote considerable space to discussing the varied mass of duties which would have to be re-allocated under any such scheme, and formulate proposals to apportion the functions of the central Government in relation to Justice broadly between the Lord Chancellors Department and the Department of the Home Secretary. The Lord Chancellor would under such a scheme, be substantially relieved from the extreme pressure now falling upon him.

The Government, the Report concludes, have already anticipated the recommondation of the Committee in two important spheres of administration—namely, Government Supplies and Health. In each case the result of their decision will be to concentrate in the hands of single responsible Minister a number of essentially similar functions at present exercised by a variety of Departments. The gradual transformation of the Ministry of Munitions into a Ministry of Supplies was announced by Dr. Addison in the House of Commons on November 12. Five days earlier it had also fallen to him to introduce the Bill for the establishment of a Ministry of Health.

BOOKS IN BRIEF.

History of Education in Ancient India. *By N. N. Mazundar M. A. B. L. Macmillan & Co., Bombay, Price Rs. 1-8-0.*

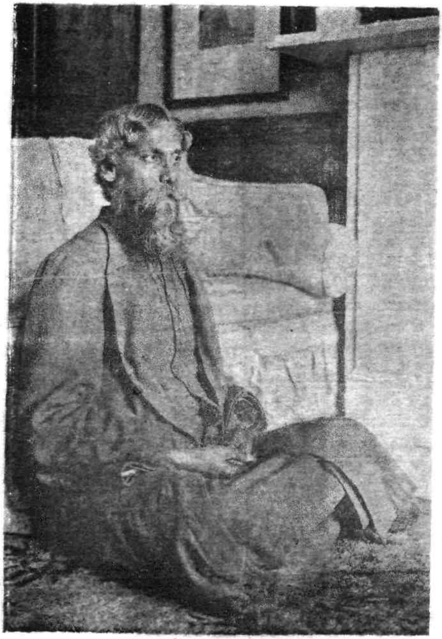
We have perused this book with great interest. It is written by way of protest against unfounded and ignorant charges against the ancient Hindus in regard to what Mr. Biss, I. E. S., who writes an appreciative preface, puts it as their "relation to the premature portion of the community." Hindu ideals and practices in regard to education are as difficult for a foreigner to understand as several other things Hindu and it is small wonder that an American writer has gone wrong about it. When we ourselves read this particular American writer—Dr. Graves of the Ohio State University—we set it down to his ignorance and nothing more. Systematic writers, however, who wish to give a compendious account of any subject ought to be careful of what they state in their productions. Imperfect generalizations are, of all kinds of generalizations, the very worst imaginable. In this particular case, Dr. Graves has to be thanked for his imperfect statement of a subject because it has been the cause of a good book being written on a subject on which there has been for long no authoritative book. Mr. Mazundar has done his work well going to the original authorities as far as possible for his facts. We would commend the chapter on "General Characteristics" to any one who wants to have some idea of the fundamental concepts underlying Hindu Education. The chapter on "Universities" is a most interesting one and will repay perusal. The book ought to be studied by would-be teachers and by those interested in Indian Education generally. We would be glad to see it studied in our Normal and Training Colleges as well.

The year Book of the Ceylon Agricultural Society, 1919—1920.—*Edited by C. Drieberg B.A., F.H.A.S., Secretary, Ceylon Agricultural Society. Times of Ceylon Co., Ltd., Colombo.*

Mr. Drieberg and his staff deserve to be congratulated on the prompt manner in which they have issued the *Year Book* of the Ceylon Agricultural Society for 1919—1920. This edition is a great improvement on its predecessor, good as it was. Much fresh matter has been added, more especially to the section dealing with Crop Notes. We note that some of the more important leaflets of the Ceylon Agricultural Department have been reproduced in this volume. This is as it should be. The map of Ceylon and the list of bulletins added at the end of the book enhance its value.

Industrial Gwalior.—*By Alakh Dhari, Inspector-General of Commerce and Industry, Gwalior State. Alijat Darbar Press, Gwalior.*

This book has been written with the express purpose of giving a clear account of the principal industries carried on in the Gwalior State. Incidentally the working of each industry during the past official year is given. Mr. Alakh Dhari prefaces his description of the industries by an excellent survey of the economic position of the Gwalior State. Education (including the idea of founding an University in Gwalior), agriculture mining, hydro-electric schemes, development of co-operation and large industries, utilization of forest products, improving the weaving industry, bettering communications and other kindred topics are all dealt with with in a clear and perspicacious manner. There can little doubt that there is a general awakening in Gwalior as elsewhere in India in regard to economic development. Mr. Alakh Dhari is, we think, right in observing that before we attempt development work generally, it is necessary to have some idea on what limnes this development work should proceed, what industries, for instance, should have precedence over others, and what should be the determining idea or ideas in regard to the construction of a well defined programme of work. The need for an economic survey of Gwalior State seems thus a necessity and it would be well to undertake this in the interests of sound development. It is, we think, almost a truism that such a survey as the one suggested is almost a necessity for every country that desires to make the most of its resources. But how few act it is needless to say. But the Gwalior State have proceeded far on the road to industrial development and they are in a position to initiate a survey on right lines. This being so, it seems necessary that they should attempt this without delay if the work they have already done is not to be lost. If Mr. Alakh Dhari's review of the present situation leads to such a survey, it will have served a very useful purpose indeed.



Sir Rabindranath Tagore.